Selections from the Records of the Madras Government.

REPORTS

ON

MOUNTAIN AND MARINE SANITARIA;

MEDICAL AND STATISTICAL OBSERVATIONS

ON

CIVIL STATIONS AND MILITARY CANTONMENTS,

JAILS—DISPENSARIES—REGIMENTS—BARRACKS, &c.;

WITHIN

THE PRESIDENCY OF MADRAS, THE STRAITS OF MALACCA,

THE ANDAMAN ISLANDS, AND BRITISH BURMAH.

From January 1858 *to January* 1862.

BY

INSPECTOR GENERAL OF HOSPITALS DUNCAN MACPHERSON, M. D.,

HONORARY PHYSICIAN TO HER MAJESTY.

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No. 23.

Office of Principal Inspector General,
Medical Department,
Fort St. George, 6th February 1862.

From R. COLE Esq.,
Principal Inspector General,
Medical Dept., Fort St. George.

To Colonel H. MARSHALL,
Secy. to Government, Military Dept.
Fort St. George.

Sir,

The Inspector General of Hospitals, Dr. D. Macpherson, Honorary Physician to Her Majesty, having lately completed, by his visit to Pegu, a tour of Inspection through all the Provinces of this Presidency, I have the honor to request you will express to His Excellency the Governor in Council, that I am highly satisfied with the zeal and energy and ability with which he has performed this arduous duty; occupying as it has four years and one month for its performance, and involving journeys by land of 12,356 miles, and by sea 11,566 miles.

2. During his lengthened and laborious tours, the Inspector General has visited all the Stations, Civil and Military, where Hospital Establishments exist, and has reported on the Barracks, Hospitals and Jails, as to all medical and sanitary matters; and these Reports contain a great deal of information, valuable and interesting, which it is highly desirable to have in a convenient form for ready reference, separated from the more trivial and transitory subjects, which have no permanent public interest. I therefore beg that you will submit to His Excellency the Governor in Council, the accompanying letter from the Inspector General with my recommendation, that the sanction of Government may be accorded to printing at the Government Press, the more important parts of the Reports.

*No. 1, 22nd Jany. 1862.

3. The tour which Dr. Macpherson has recently made throug British Burmah, being over new and comparatively unknown ground presented many features of unusual interest, and the Report thereon which accompanies this letter, I beg to bring specially to the notice c Government, together with a Report on Curlev Island†, in the Gulf of Martaban, proposed by the Inspector General as a site for a Marine Sanitarium for sick Soldiers from the mainland o India. These two Reports I respectfully recommend to be printed in the form of a "Record o Government," and I would suggest that it shoulc be sent to press at once, as the subjects are of immediate interest, anc the question of the marine sanitarium I consider one of special importance, which will have to be discussed, and I think it desirable to have the Report in a shape in which it can be circulated to, and easily perusec by, the authorities who will have to consider the subject. The Repor on Burmah contains much which has reference to Civil Establishments in that country under the jurisdiction of the Supreme Government which should be communicated to His Excellency the Governor General and in the printed form it would be more conveniently rendered. I alsc beg to forward a "Sketch Report of the Andaman and Barren Island," in connexion with the subject of a *Marine Sanitarium*, which, I think worthy of being printed as a sequel to that on Curlew Island.

† This Report has reached Government from the Commander-in-Chief, for transmission to the Sanitary Commission, and has been printed. I therefore do not now transmit the copy sent to me by Dr. Macpherson.

I have, &c., &c.,

(Signed) R. COLE,

Principal Inspector General,

Medical Department

PREFACE.

By direction of Principal Inspector General R. Cole, Esq., Honorary Surgeon to Her Majesty, I prepare for printing the Inspection Reports compiled by me while engaged in the duties devolving on the Inspector General of Hospitals, namely, as detailed in G. O. G. dated 23rd February 1858 and 17th July 1860, the examination of all Military and Civil Hospitals and Dispensaries, Depôts of Medical Stores, and Establishments connected with the Medical Department; with the view to ascertain that the duties of all ranks are thoroughly performed, that the regulations are strictly carried out, that stores are in sufficient quantity, and generally that every branch of the Department is in a perfectly efficient state.

In regard to Military and Civil Stations, the leading objects of my inspection were, "to inquire into and report upon the sanitary condition, state, construction, adaptation and defects of all public buildings, barracks, hospitals &c.; to ascertain that the sanitary requirements of Jails are strictly observed; to investigate the causes of any unusual sickness or mortality amongst troops, prisoners &c.; and to report fully on all subjects affecting the healthiness or otherwise of buildings, localities, or stations."

I was further directed to communicate freely with the local authorities on all professional and sanitary questions, so that, in urgent cases, my recommendations might be at once carried out, or if necessary be submitted for the approval of higher authorities; my presence at a station being taken advantage of for the investigation in Committee of all matters referring to Sanitation.

Fragmentary extracts from my reports have been from time to time printed, but it is now deemed desirable to print the compilation as a Government record in a connected form; as being the first Medical Inspection Report of every Station and Department under the Government of Madras.

My duties, which embraced the entire Presidency of Madras, the Settlements in the Straits of Malacca and British Burmah, have occupied me uninterruptedly for four years; with a residence, of not above three months at any one place, entailing journeys on land of 12,356 miles, and by sea of 12,566 miles.

My original reports having been arranged in the form of "Series" they are now printed in a like form, but subjects of a similar character formerly dispersed throughout the series, are now brought together, and all matters bearing on the personal character of individuals are carefully excluded. A table of contents is added to the volume.

Series No. 1	treats of	Mountain ranges, Insular and Marine stations as Hygienic localities for European soldiers and their families.
Series No. 2	do.	Mysore Division.
Series No. 3	do.	Southern Division.
Series No. 4	do.	Centre Division.
Series No. 5	do.	Presidency Division.
Series No. 6	do.	Ceded Districts.
Series No. 7	do.	Nagpore, Jaulnah and Hyderabad.
Series No. 8	do.	Northern Division.
Series No. 9	do.	Straits of Malacca.
Series No. 10	do.	British Burmah.
Series No. 11	do.	Prostitution and Lock Hospitals at Military stations.
Series No. 12	do.	Duties of Administrative and Executive Medical Officers and Subordinates.

With the view to classify the various subjects referred to in these Reports, so as to bring them into a somewhat connected form, alterations have been made during printing, which renders a Chronological Table necessary showing the order in which the Reports appeared.

Between the months of January and July 1858.

Inspected and reported on Chingleput, Cuddalore, Trichinopoly, Tanjore, Combaconum, Negapatam, Tranquebar, Madura, Tinnevelly, Trevandrum, Quilon, Cochin, Calicut, Mulliapoorum, Tellicherry, Cannanore, Mangalore, Coimbatore, Salem, Vellore, Chittoor, Arcot, Poonamallee, Palaveram, St. Thomas' Mount, and treated on the subjects of Prostitution at Military Stations. Duties of Commissioned and Non-Commissioned Medical Staff.

Between the months of August and December 1858.

Inspected and reported on the following Mountain Ranges. The Shevaroy Hills, the Pulney Hills, the Neilgherry Hills, the Annamullay Hills, and the Stations of Bangalore, Mysore, Hoonsoor, French Rocks, and Mercara.

Between the months of January and June 1859.

The Stations of Jaulnah, Nagpore, Kamptee and Secunderabad were inspected and reported on.

Between June and September 1859.

The following Civil and Military Stations within the Northern Division were inspected and reported on. Juggiapett, Bezwarrah, Masulipatam, Ellore, Dowlaishwaram, Rajahmundry, Samulcottah, Cocanada, Vizagapatam, Vizianagrum, Chicacole, Kimedy, Chitterpore, Berhampore, Itchapore, Russelcondah, Juggernauth Pooree, and Cuttack.

Between September and December 1859.

The Presidency Division and the following Stations came under Inspection and report. Cuddapah, Nellore, Guntoor, Ongole, Cumbum, Kurnool, Ghooty, Bellary, and the Ramandroog.

Between January and July 1860.

The stations of Hurryhur, Sircy and Field out-posts in North Canara, Sedashagur, Honore, Mangalore, Mercara and Bangalore, were visited and reported on.

Between July and December 1860.

The Stations in the Straits of Malacca, viz., Penang, Malacca and Singapore were visited and reported on.

Finally, the year 1861 was occupied in visiting and reporting on the following localities in British Burmah, Rangoon, Henzedah, Myan-Oung, Prome, Thyetmyo, Meaday, Tonghoo, Shuay Gheen, Moulmein, Martaban, Amherst, Tavoy, Mergui, Curlew Island, Bassein, and Port Blair in the Andaman Islands.

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SERIES No. 1.

MOUNTAIN AND MARINE SANITARIA.

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SKETCH MAP
of
TERRITORY IN INDIA, BURMAH, AND STRAITS SETTLEMENTS
OCCUPIED BY MADRAS TROOPS
TO ACCOMPANY REPORTS OF MOUNTAIN AND MARINE SANATARIA
BY
D. MACPHERSON, M. D.
INSPECTOR GENERAL OF HOSPITALS.
N.B. The double line under a name indicates established Sanataria. A single line under a name indicates places eligible for the location of Troops or Invalids. Numerals entered thus 7600 show the elevation of the place above the Sea. Numerals entered thus 642 show the numerical strength of European Troops at the Station.
SCALE 90 MILES TO AN INCH.
Signed / F. H. Scott Lt. Col. Qr. Mr. Genl.
Qua. Mas. Genl.'s Office
Fort St. George, 29th Sepr. 1867.
Colonel R.E.
Chief Engineer D.P.W.
CALCUTTA
BOMBAY
MADRAS
HYDERABAD
NAGPOOR
VIZAGAPATAM
BANGALORE
MYSORE
BELLARY
GOA
COCHIN
TRIVANDRUM
PONDICHERRY
TRICHINOPOLY
CANNANORE
RANGOON
UMMERAPOORA
AVA
B U R M A
N A G P O O R
T E R R I T O R Y
N I Z A M ' S
D O M I N I O N S
ANDAMAN ISLES.
Port Blair
Little Andaman
M A L A Y A
Strait of Malacca
Penang Hill
S U M A T R A

SERIES No. I.

MOUNTAIN RANGES—INSULAR OR MARINE STATIONS AS HYGIENIC LOCALITIES FOR EUROPEAN SOLDIERS AND THEIR FAMILIES.

SECTION I.

The Shevaroy Hills.

SERIES I. SECTION I.

Mountain Ranges.

It is a remarkable peculiarity in the physical condition of this country, that in the midst of most of our extensive plains, elevated localities are also placed, which secures a genial climate, both to European and Asiatic. Without going beyond the area of our own Presidency, we find placed within convenient distance of most of our stations, solitary hills or mountain ranges, peculiarly adapted both by meteorological condition and geographical position for the purposes of sanitary stations, and possessing a climate more nearly resembling that of our own country, in which the European constitution, enfeebled and deteriorated in the plains, becomes refreshed and invigorated.

For example, the Shevaroy Hills are within easy reach of Madras; the Neilgherries contiguous to Bangalore and Cannanore; the Pulney Hills are centrally placed in the Southern Division of the Army; the Ramenhilly Hills close to Bellary, the Head Quarters of the Ceded Districts, Beder, and Booldana; the Checuldah Hills midway between Secundera-bad and Nagpore; the Muthoor range favorably situated for Saugor and Nerbudda; and, the Gallicondah adjacent to our Military stations in the Northern Division of the Army.

It would almost appear that an over-ruling Providence had specially provided the means of imparting vigour to the constitutions of the people of our nation, hitherto so highly favored by Him, and who are destined, we hope, to introduce a higher civilization amongst the people of this land.

The Extracts from the Minutes of Consultation, Nos. 667 and 1,458, dated 22nd February and 27th April 1858, show that the Home authorities and this Government are now earnest in their desire to procure information on all matters relating to the selection and improvement of localities for barracks for European Troops in the plains and on mountain ranges.

SERIES I.
SECTION I.

Sanitary state of the Army.

Before entering on the consideration of a subject of so much importance, I will first quote from undoubted statistical data, the fatal results of our past system. Sir Ranald Martin, one of Her Majesty's Royal Commissioners to report on the sanitary state of the Army, states, "We have the assurance of Sir Alexander Tulloch that from the year 1815 to 1855 inclusive, a mortality of about 100,000 occurred amongst European Soldiers in India, many of whose lives might have been saved had better localities been selected for Military occupation.

"It has been further asserted by Dr. Burke, late Inspector General of Hospitals in Bengal, that at the station of Secunderabad alone, during a period of thirty years, the cost to the State on account of loss of lives, amounted to £150,000, estimating each at £100. At the same valuation, the loss of life mentioned by Sir A. Tulloch would be ten millions sterling.

"In the year 1853 a discussion took place in the House of Lords regarding the decrement of European Troops in India. On that occasion Lord Ellenborough drew the attention of his brother Peers to the facts, that while one of Her Majesty's Regiments in India disappeared altogether in the space of twelve years, the Regiments of the Company passed entirely from the scene of their labors, either by death, removal, or invaliding in the shorter space of eight years. From the statistics in the possession of Lord Ellenborough at the time when he made this astonishing statement, his Lordship drew a deduction which was, without doubt, indisputable. It has, in fact, never been denied; but it has been argued against him that the statistics from which the deduction was drawn were made long antecedently, that they represented the year 1830 rather than 1853, and that the disproportion of losses was in modern times nearly, if not entirely, removed."

The epitome of the sanitary condition of Soldiers in India at present, or until within these three years, is brief. From the years 1846 to 1854, the European force serving in Bengal, according to the able and accurate statistics of Surgeon Hugh Macpherson of that Army, sustained an annual loss of nine per cent. of its numbers, or a gross annual average of 1,759 out of 19,517, and a total in the eight years of 14,072; and these losses were not by the sword or the rifle, but by disease. We might add to these particulars; we might follow in detail an Indian European Regiment through an eight years' service, and the result would only be the more striking: for in the absence of rebellion or hard fighting, there is a natural disease decrement of Indian European Troops, leading in some

of the provinces to the entire absorption of an European Regiment in from nine or ten or at the extreme eleven years. This, at all events, has been the case in Bengal in times of comparative quiet.*

Sir R. Martin on Hill Stations.

In his evidence before the Colonization Committee of the House of Commons, Sir Ranald Martin states, that "the hill districts are better fitted for the prevention of disease than for the cure of diseases. Children brought up in these districts would have a long duration of health. When there is a facility of communication and easy access to the hill districts, the duration of European life would be increased. By improved methods of placing the troops he thought the mortality might be reduced to the level of mortality in England. He thought the hill districts were adapted for the colonization of grown up English people, provided the plateaus were large enough to support them. He believed there was not a province in India, in which mountain ranges could not be found available for European residents, Civil as well as Military. If Europeans were to leave the plains for the hills from time to time, their health might be excellent and they might be long-lived."

Major General Tremenheere when questioned before the same Committee stated, "The climate of the plains of India was decidedly adverse to the settlement of Europeans. In the hill districts the case was otherwise. Bodies of well-trained Mechanics and Agriculturists would be a great boon to India. As a means of increasing the European element in India, he would recommend that there should be an extension of licences granted to Soldiers to marry, and to give grants of land in the hills to Soldiers whose terms of service had expired."

Political, financial, as well as hygienic considerations, therefore, demand that our English Soldiers should be located in the most innocuous situations, and undoubtedly the summits of mountains possessing table land and a good water supply, should occupy our first consideration.

There are manifest difficulties in forming a correct judgment of the salubrity of any new and unknown locality, for there are positions which appear to the eye to possess all the known characters of a healthy place of habitation where malaria may exist in high intensity; and of these there are perhaps none in which it is so difficult to arrive at just conclusions, as the vicinity and on the summits of mountains.

As I advance in my tour, I shall make it my duty to report, not only on our already known hill stations, but also on such others, as appear to me suited for the location of Europeans; and first, I refer to the

* Medical Times, October 10th, 1857.

SERIES I.
SECTION I.

Topography.

Shevaroy range.—These Hills form one boundary of the Salem valley. They approach to within five miles of the town of Salem and extend in a northerly direction towards the flat land of the Baramahl. Their greatest altitude is generally computed at 4,190 feet above Salem, and 5,200 above the level of the sea; but the general height of the table land does not exceed 4,600 feet.*

Deputy Inspector General Graham, an Officer who is intimately acquainted with the Shevaroys, from a residence of eight years in the immediate neighbourhood, states:—" Previous to 1824 the Shevaroy Hills were much frequented by invalids and others, but in June 1824 a severe fever broke out on them, which caused them to be deserted."

" From the observations of several years, I am satisfied, that as a general rule, these hills are free from fever during the dry months, and in fact are always so until after the first smart fall of the rains. Thus I have observed every year, for the last six, to have been marked by an endemic accession of fever in May or June, according to the time the first smart showers preceding the south-west monsoon fell on the hills. Between these showers and the regular setting in of the monsoon, a space of from fifteen to forty days obtains, the period of the prevalence of fever, and which fever ceases when the rains are fairly established; nor does any protracted fall of rain seem necessary to restore salubrity, or to maintain it. Thus in 1833 very little rain fell after the end of June, and comparatively little during that month; nevertheless from the end of June the hills became and continued perfectly healthy: nothing can be more delightful than the climate throughout the year. I have known many instances in which persons who have visited both the Shevaroys and the Neilgherry Hills, give the preference to the former as possessing the softer and more agreeable air."

In prosecuting my inquiries into the sanitary condition of these and other mountains, as proposed by Dr. Dempster in the Minutes of Consultation above quoted, I shall give due weight and consideration to all conditions generally admitted to be indications of healthy or unhealthy localities, and institute careful inquiries into the sanitary condition of the Native inhabitants residing within, or in the immediate vicinity of, the position under consideration.

My first visit to the Shevaroy Hills was in the supposed fever months, immediately after the first fall of rain. There were still occasional heavy showers, and the summits of the mountains were frequently enveloped in

* Topography of Southern Division, 1843.

mist. I found forty families resident there, having on an average four members to each family. Some of them had not seen the plains for four years, and the family of a Missionary had been almost constantly on these Hills for eighteen years. I was forcibly struck with the healthy, rosy complexion of the European ladies and children, to whose constitutions the climate is peculiarly adapted. During the day brisk exercise was necessary to one's comfort, and in the afternoon a fire was equally so.

From Mr. Marrett, the Zillah Surgeon of Salem, which Station is five miles from the foot of the Hills, whose family are always resident on the mountains, and from other well-informed parties, I learned that between 1824 and 1854 these hills remained comparatively free from fever. In May and June 1854, fever re-appeared with considerable force from the following distinct causes.

Fever.

For some years previously the slopes and summits of these Hills had been much resorted to for Coffee cultivation. At first it was usual to burn the felled timber and low jungle, but a different system was introduced in 1853-54. In that season nine extensive estates were opened, and the jungle was left undisturbed where it fell, in order to protect the young plant, and in process of decay to enrich the soil; during this season also there was a severe drought throughout all our provinces, and much sickness every where; but Mr. Marrett states, "that the mortality was slight, as compared with the number attacked—a fact that offers a favorable inference as to the character of the fever, which is by no means malignant, and if met in time, cannot be regarded as in any way dangerous."

I have formed a very favorable impression of these hills. There are few or no stations in India which are altogether free from endemic disease. Fever we find every where; occasionally it is seen at Coonoor and even at Ootacamund, as well as on the Shevaroys. The position occupied by Europeans at present on the latter, presents an uneven surface, which was until lately covered with low jungle. Now the jungle has disappeared, and Coffee cultivation is seen every where; neat cottages have sprung up; paths have been formed all over the mountains; invigorating and healthful exercise can be enjoyed morning and evening and often during the day, while the cool nights invite sleep and add vigour and tone to the frame.

As cultivation advances, and with it comforts are introduced, I firmly believe that fever as an endemic disease will disappear, and that the Shevaroy Hills will yet be one of the most valuable sanitary

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stations in the Presidency. The Railway to the foot of these Hills will enable the community at Madras to resort to them in a few hours.

Climate.

With Messrs. Graham and Marrett, I am of opinion that the climate of the Shevaroy Hills, if not so bracing as that on the higher mountain ranges, has the advantage of not being subject to those extreme alternations of heat and cold, which are common on the higher plateaus, where affections of the air-passages and functional derangement of the liver and bowels, are prone to deteriorate. The oldest resident on these hills informs me, that parties suffering from boils rapidly get rid of the troublesome affection on these hills.

The prevailing winds are north-east and south-west, six months of each, steadily.

The following are the Thermometrical observations for the first six months of the year at Yercaud, that part of the hills on which the European residents reside. After June, fires are agreeable in the afternoon.

	Average maximum dry bulb inside house.	Average minimum dry bulb inside house, and doors and windows shut.
January...........	70°	60°
February.........	70°	60°
March..............	73°	63°
April...............	75°	68°
May................	75°	68°
June...............	72°	67°

On the Green Hills, which rise 1,000 feet above Yercaud, I selected a spot of undulating land, 250 acres in extent, as an excellent site for a Sanitarium and a Depôt for European Recruits on their arrival in the country, and for Invalids and time-expired men, previous to embarkation for England. The site is near the village of Muryakoattay, four miles distant N. W. from Yercaud. On this land is a long and narrow swamp bounded by six hills; three small streams, of which two are perennial, run into this swamp, and uniting, pass out of it through a narrow gorge at its western extremity. The hills at the north, south, and west of the swamp are all more or less under cultivation, (wheat, coffee, and plantain gardens) and present a marked contrast in their appearance to the black and rocky hill which forms its eastern boundary.

The mean elevation of this part of the Shevaroy Hills is 4,800 feet above the sea, and the land slopes upwards to the Green Hill plateau, altitude 5,080; the most elevated part attaining a height of 5,300 feet;

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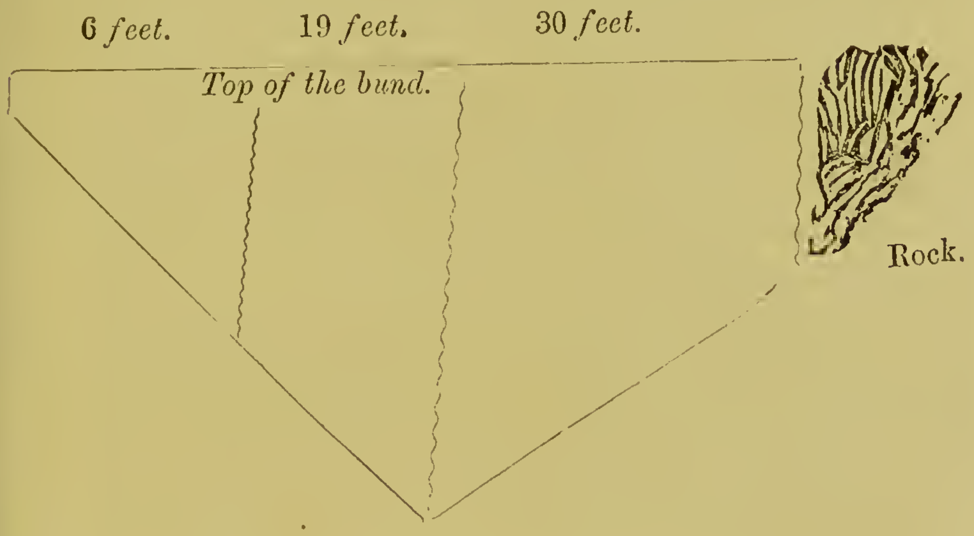
the town of Salem being only 870 feet above the sea. The thermometer under a tiled roof at this place in August ranged from 69° to 74° during the twenty-four hours.

By throwing a bund 150 yards long and 30 feet in extreme height (*vide* section) across the gorge at the upper end of the swamp, a lake



with a water surface of fifteen acres and a mean depth of ten feet would be formed; while by a few inexpensive drains, the other half can be turned into a parade ground. The discharge of water from the swamp at present is over 30,000 gallons in twenty-four hours, and about as much is taken off above the swamp by planters, for the purpose of irrigating their coffee, &c. Thus in the dry months a daily supply of about 60,000 gallons could be ensured, and in the rainy season of June, July, October and November, at least four times as much. At no time of the year, March and April perhaps excepted, would the supply be less than it is now.

These hills are most suitable for Barracks. On the upper slopes are ample space for Hospital, Quarters for Serjeants and married men; and, on the lower incline, close to the lake, Workshops and Gardens could be placed. The hill to the south would be a good place for a Bazar and Native followers, and a very good situation for Officers' Quarters might be had, with plenty of water, on the side of the hills and on the valley to the south.

There are two lines by which a tolerably easy cart road could be taken from the Depôt to the low country, the most direct being the Railway

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terminus at Mullapoorum six miles in length. The other would be about four miles in length, and would join the main line to Salem at a point about 3½ miles from Yercaud. For the construction of the Barracks, chunam must be taken from Mullapoorum and most of the timber from the Katapully jungles; the road would therefore have to be completed before the Barracks are erected; abundance of sand and earth for brick-making are to be found on the spot. These suggestions are offered for the consideration of Government, in communication with Captain Gahagan, the District Engineer, whose acquaintance with these Hills extends to upwards of four years, and who has carefully surveyed and marked out the ground. Dr. Cleghorn, Conservator of Forests, has favored me with the following notes regarding the vegetation in the vicinity of the site of the proposed Depôt.

"The high grassy summits yield no forest, but are clothed with pasture; here and there gneissian rocks force their way to the surface and support only herbaceous plants of inferior organization as lichens, club-mosses, &c., and in the valleys among the shady and humid rocks, appear the cylindric stem and delicate foliage of the tree fern (Alsophia.) The annexed list includes the most characteristic genera of plants observed cultivated.

Wheat.
Potatoes.
Loquat.
Sinapis (Mustard.)
Brazil Cherry.

WILD:—The most striking plants are:

Rubus (2 sp.) Bramble.
Solanum Giganteum.
Souchus obraceus (Sowthistle)
Berberis Tinctoria.
Eriochlani Hookeriana.
Gnaphalium (2 sp.)
Crotolaria (several sp.)
Physatis.
Strobilanthes.
Alsophila
Actenopteris (radiata.)
Aspidium.
Hermianitis Cordata.

"This list is very fragmentary, and only embraces the striking features of the local flora, as observed in the beginning of July; however it is sufficient to indicate the character of a subalpine vegetation, intermediate between that of Ramandroog and Coonoor. The flora of the Shevaroy Hills is very similar to that of the Yellageri and Javadie ranges, but being a little higher and more humid, it presents a few additional alpine species."

Now that the Railway is constructed to the base of these mountains, a most desirable system of exchanges of troops may be conducted with ease at all seasons from the Presidency to Mullapoorum, distant 180 miles from Madras and eight from the foot of the hills; here the ascent to the summit is easy, and as Government has sanctioned the construction of a good road from the plains, this delightful locality will shortly be within nine hours of Madras. Accommodation should be provided here for worn out and time-expired men, and for the young Soldier just landed from England. The arrangement which obtains at present, is to transport the recruit on his arrival, and the invalid whose constitution has been shattered on the plains, or from wounds and long service, to Poonamallee or to Arcot, there to remain until finally disposed of. Hereafter the Recruit may land from the ship in the afternoon opposite the Railway station, and breakfast on the hills the following morning.

At Yercaud, on the Salem side of the hills, where the European inhabitants have built their houses, the surface is broken, rocky, and jungly. On the Green Hills and the Balmodies, five miles westward, the jungle disappears, and we arrive at those grassy banks, where it is asserted, we are safe from fever.

SECTION II.

The Pulney Hills.

I visited the Pulney Hills in company with Mr. Colebrook, the Zillah Surgeon of the neighbouring station of Madura, who has resided on them at intervals for many years past.

It is now twenty-two years since Captain Ward, of the Surveyor General's Department, first reported on these lofty mountains;* two years after the date of Captain Ward's visit, Dr. Wight of the Madras Medical Department, reported on their vegetable products.*

* Madras Literary Journal, Vol. VI, 1837.

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The Society for the Propagation of the Gospel established a mission on the table land of the Pulney Hills fourteen years ago, which they denominate "Mount Zion." In their Journal for 1851-52, there are a series of interesting letters descriptive of the country and its inhabitants, and on the introduction of Christianity amongst them.

Mr. Clarke of the Civil Service, whose family resided on these hills for a long series of years, in his report to Government, dated May 1853, speaks highly of the Pulney Hills; and Colonel Horsley, now Chief Engineer, in August 1855, drew the attention of Government to the expediency of improving the communications between these hills and the plains.

The following observations, relating to these elevated mountains, contain the results of my own observations, and the information culled from others who from long experience are able to testify to their value for the preservation and the restoration of health.

Position.

The Verrugherry and Kummudaven mountains, now commonly called the Pulneys, from their vicinity to the famous temple of that name, lie between 10° 10′ and 10° 44′, and the longitude between 76° 21′ and 77° 22′. They are distant from Trichinopoly, the Head Quarters of the Southern Division of the Army, about 80 miles, and about half that distance from the civil station of Madura. They lie west of Dindigul, south of Pulney, and north of Periacolum. According to Captain Ward, the elevation of the plateau land is 7,000 feet above the level of the surrounding plains—some of the peaks and ridges having a still higher elevation. The superficial area of the hills is calculated at 800 square miles, their length from east to west is 54 miles, and their medium breadth 15 miles.

Passes.

The principal Passes from the low country are—1st, on the north from the village of Pulney to Poombaray, a hill village to the west, and Vilputty a hill village to the east; 2nd, on the west from the village Ruttiambudy to Maravanoor, a hill village to the west; 3rd, on the north-east from the village Periacolum to Kakanal, a hill village to the west; 4th, on the south-east from the Danedanaputty to Palamalay and Sambanoor to the north-east. The slope by each of these passes seldom exceeds 1 in 12.

Topography.

The hills are divided by the hill-people into two distinct portions, viz., the Mel and Kel malay, the high and low or eastern and western ranges. To the west, the table land reaches 7,000 feet, and gradually descends to the east, forming distinct plateaus, at intervals of about 1,500 and 1,000, and 500 feet, until the plains are reached. The ranges are connected to the Travancore and south-west mountains by an isthmus about eight miles wide, being isolated on every other side. To the south, the hills are excessively steep, presenting at their summit a magnificent wall of granite.

To the north and east they slope downwards towards the low country in extensive broken ridges, and to the west the hills fall gradually, and form at their base the valley of Ungeenad, from which the ground again rises abruptly to the south-west. The higher lands are free from wood and are covered with grass. The spurs which run down in every direction are intersected with deep ravines covered with dense luxuriant forest, resembling the "sholas" on the Neilgherries, and affording a greater variety of timber the nearer they approach the opencountry.

In the heart of these mountains are situated rich and fertile valleys, which, intersected by numerous streams of various magnitude, picturesquely contrast with the bare and rugged heights which surround them, and in some spots present a view in the highest degree sublime.

Streams.

There are upwards of thirty large streams on these hills, which, uniting, form eleven respectable rivers. From the summits of the higher peaks overlooking the plains, these rivers are seen meandering through dense forests, down deep ravines, and over cultivated valleys, and finally pass down to irrigate the rich districts of Madura and Dindigul.

The chief of these is the Wankosi river, which, rising in the Putchamalay hills, precipitates itself down to Kotalvilly in a perpendicular cataract of 150 feet, into a deep basin, worked by the force of the fall, in the rock below.

Villages.

The sites of the villages are generally selected with much taste. The houses are in regular clusters, built of mud and stone and thatched. They have each a fire-place, and sheds for cattle are attached. The slopes in the vicinity of the villages are formed into terraces, on which are cultivated garlic, mustard, barley, wheat, and a grain similar to oats; as we descend, rice-fields gradually rise in a succession of terraces, irrigated from above by artificial canals.

Mr. T. Clarke, who, from his long residence on the Pulney Hills, is the best authority we possess, states that they may be divided into seven grand divisions, being so many portions of their length and breadth, principally marked off by large and prominent ridges, or by rivers running across the hills, as follows:—

1st. *Yettoor*, or the eight villages (sometimes called Mannavanoor, from the largest of the eight), at the extreme west, is of a parallelogram form. The river Ambravutty, after running a course of few miles from its source to Manjaputty, where it receives the Tennar, forms the western boundary of these villages, and separates them on that side from Travancore and Coimbatore; to the south, the Zemindaries of

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Bodmakanoor and Vadagherry border their limits; and on the north, the village of Poombaray with its hamlets intervenes between them and Pulney; and on the east, the same village divides Yettoor from Vilputty.

2nd. *Poombaray*, bounded on the north by Balasamoodrum and the Rettiambudy Zemindary; on the south by Yettoor and the Vadagherry Zemindary; on the east by Vilputty; and on the west by Travancore and Coimbatore.

3rd. *Vilputty*, separated in the west from Poombaray by the high-marked ridge which forms the Tennavaray peak; and on the north, from Cowanjee and other hill villages belonging to the Ayacoody Zemindary by the no less remarkable ridge which runs along the base of the highest point on these hills known as Permalmalay. The ridge continues on the east side of Permalmalay, and separates Vilputty from Tandigoody; on the south Vilputty is bounded by the hill villages appertaining to the Vadagherry Zemindary and the exterior ridge of the hills.

4th. *Cowanjee*, embedded in high rocks, is bounded on the north and west by the villages of Balasamoodrum and Ayacoody; on the east by Patchaloor and Tandigoody; and on the south by the village of Tandigoody.

5th. The *Pareyoor Hills* are very extensive, covering an area of about ninety square miles, and are in the form of an isosceles triangle decreasing to a point on the north side. They are bounded on the south by the Tandigoody hills; on the east by the Andaloor hills and by the Putchamalay range; on the north and west by the villages of Virupatchy, on the plains and the village of Cowanjee.

6th. *Pandimalay*, Andaloor and Manaloor hills, form the eastern boundary of the hills, and are bounded on the north by Pulkanooth and Cunniwady; on the east by Durmattooputty and Ahtoor; on the south by Narasingapooram and Ayempollium; and on the west by Tandigoody and Patchaloor.

7th. The *Tandigoody* hills are bounded on the south by Davanaputty; on the west by the river Ambany and Permalmalay; on the north by Pareyoor; and on the east by Manaloor.

Of these divisions, the fourth and sixth belong to the Zemindaries of Ayacoody and Cunniwady; and the first, second and third form the upper range; and the fifth and seventh the lower range of the hills.

Inhabitants.

The inhabitants of these hills are supposed to number about 4,000 of both sexes. The villages have a mixed population,—some

live by plunder, but the majority are a mild and inoffensive people. They are divided into the following tribes :—

Paliars, Korravurs (or mountaineers), Asaries and Chetties. There are also a few scattered families of a wild tribe of Paliars who dwell in the woods and subsist chiefly on honey, roots, &c., and live in caves, or on platforms erected on trees in the heart of forests. Their habits are very erratic, and they are shy of strangers.

1st. The *Paliars* are supposed to be the aborigines of these mountains; according to their traditions they date their possession as far back as four or five centuries ago. They are a people perfectly distinct from those of the plains, in habits, feelings, and dialect; being free from many of their prejudices and superstitions.

2nd. The *Korravurs* profess to be the hereditary masters of the hills; but this is evidently a convenient tradition of their own, for there are other traditions extant, which show that they took possession in violation of the more ancient claims of the Paliars. To judge from appearance they are a mixed race, descended probably from different castes, whose fathers emigrated from below. They are the chief landed proprietors and hold the Paliars in a kind of serfdom, exacting from them every menial species of labor ; in return for which they permit them to cultivate land in the most sequestred parts of the mountains, grant them liberty to eat the flesh of dead animals, and to make use of such fruits and herbs as are found in the woods ; notwithstanding their degraded position, the Paliars have a considerable influence as priests and physicians. They alone understand the use of medicinal herbs, and the virtue of their incantations, as well as of their medicines, are highly extolled and deemed equally efficacious.

3rd. The *Asaries* are the professed carpenters and blacksmiths of the hills.

4th. The *Chetties* are the most recent emigrants from the plains. They deal in the principal products of the hills, lend money on exorbitant interest, and are in fact the capitalists. They are gradually acquiring the whole of the landed property of the mountains, and they keep up a close connection with the Chetties of the low country.

Vegetable products.

There is a vast extent of forest land in the valleys and glens ; but a rapidly increasing cultivation, the effect of a proportionate increase of population has led to the destruction of many valuable forest trees. Some trees that still remain are of surpassing height, and conceal from view by their dense foliage the little villages which they surround.

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Lieutenant Beddome, Assistant Conservator of Forests, who has lately explored these mountains, states that the grass on the plateau on the top is everywhere dotted with beautiful orchidaceous plants and many others peculiar to a high altitude. The rhododendron, the lime and the orange are indigenous, and there is an inexhaustible supply of gentiana and other medicinal plants. Recently coffee has been extensively cultivated on these mountains; the luxuriance of the shrub and the flavour of the berry grown there attracted the attention of the late Madras Exhibition.

Wild animals.

Elephants frequent the sholas; there are Bison and Elk in abundance. Bears are numerous, as are also the Tiger and the Cheetah. The mountaineers exhibit a great fondness for hunting, and they destroy the Tiger by poison. When a Tiger kills a bullock, a poisonous compound of roots and herbs mixed with sugar is rubbed into the fleshy part of the carcass; when the Tiger returns to his prey, he eagerly devours this portion. This produces a powerful thirst; the first draught of water quickens its operation and kills him in a few hours. The death of the animal is then celebrated with public rejoicing.

Climate and seasons.

In referring to the important subject of climate, I can only speak of my personal experience during a limited stay on these hills, in the end of the month of March. I had shortly before then made a similar short stay on the Neilgherries. This being my first visit there also, I was therefore well able to contrast the climate of both places, and I gave a decided preference to the Pulneys. Frost was present every night, and the atmosphere was more exhilarating to the feelings than I had found it at Ootacamund in the end of February. In the early part of the day the wind blew steadily from the north-east, but towards the afternoon it veered round to the south, bringing up the sea breeze. The climate is doubtless admirably adapted for the unimpaired European constitution and for the valetudinarian.

The highest point of the Pulney Hills is not far from 8,000 feet above the sea. One of the Missionary houses stands at an elevation of 7,500; other houses are placed at 6,800 feet above marine level.

					7 A.M.	NOON.	5 P.M.
The medium temperature	for the	month	of	March	55°	66°	64°
The minimum	do.	do.	do.	...	52°	64°	62°
The medium	do.	do.	do.	April	56°	67°	65°
The minimum	do.	do.	do.	...	53°	65°	61°

The maximum of the Thermometer throughout the year is 72°, the minimum 22°; and as a general rule the temperature is 25° under that registered at the Civil station of Madura, the Head Quarters of the district, the variation during the twenty-four hours being 12° to 15°. SERIES I. SECTION II.

Westerly winds set in and continue until about the first week in September; their force is broken before reaching the eastern portion of the range. The north-east monsoon appears early in October. There are more clear days on the Pulneys than on the Neilgherries, and the climate is less damp.

Four circumstances naturally affect the climate of these Hills: 1st, their elevation; 2nd, their isolated position; 3rd, their situation between the East and West coast, the distance being about sixty and eighty miles respectively; 4th, their position near the line of demarcation of the two monsoons, whose annual well-marked cycle may be thus explained.

Over the peninsula of India the winds make an annual tour as regular almost as clock-work. To commence, say from the Eastern coast, they blow direct from the east about the end of February and beginning of March; then from south-east, gradually going south, until by the middle of April they blow from the South, veering round towards the west, these winds bring up moisture from over the Indian Ocean, and rain falls on the high lands of Ceylon, and extends usually over the southern part of the Peninsula; towards the end of May the winds blow from the south-west and west, bringing up large banks of clouds towards the Western coast, which in the end of that month and beginning of June burst on the coast, the high lands of the ghauts receiving the great bulk of the rain.

The rain falls heaviest at the western end of the Neilgherries, on the Koondas, which are the highest parts of the line of ghauts, and in Coorg. On the coast it is higher towards the south, increasing opposite the Neilgherry range to about 120 inches, which is the average fall at Calicut, and continues about the same up to Mangalore (opposite the higher parts of Coorg where 180 inches fall) after which it decreases. At Bombay the fall of rain is not more than about eighty inches. It goes on decreasing as it passes into Guzerat, until it is lost altogether, there being no monsoon in Scinde. The rain passes inland from the Western coast over the Mysore and the Deccan, and goes northward and eastward. The south-west monsoon sets in and prevails in Pegu at the same time as on the Western coast, and the fall of rain diminishes as it goes inland north and east just as it does in this Peninsula. It will appear from this that the Neilgherries on their western side receive very heavy rain, which extends very much to Ootacamund; whereas the hills to the south-east of the Neilgherries such as the Pulneys, which are so much more inland, receive a lighter fall,

at the same time that they share in the earlier rains of April, and again in the latter rains of the north-east monsoon, thereby giving them more the character of the climate of Kandy and Nawera Ellia and a greater freshness throughout the year and in a measure a freedom from the aridity which prevails on the Neilgherries for three or four months.

Mr. T. Clarke, the best authority we have on the climate of these hills, from his long residence on them, observes on this important subject:

"The year is divided into two seasons; the cold season, similar to the autumn of the south of France, may be said to set in from December and terminate in March, whilst the monsoon season, resembling a mild autumn in the south of England, occupies the remaining months.

"With reference to the climate of the higher hills in particular, the following, as far as I am able to learn, may be considered a pretty fair estimate.

"January is uniformly fair, clear, and dry. The nights are very cold and attended with frost in the valleys. The same remarks will apply to February, except that frost is stronger, and in March it disappears, when the weather becomes milder. There are also a few heavy showers. Towards the close of April, the wind begins to vary from north-east, and finally settles in south-west, when the air becomes mild and balmy. May is the warmest month, but the heat is often relieved by the fall of rain in torrents, intermingled with an ushering in the south-west monsoon, which occurs in the early part of June and continues with greater or less constancy throughout July and August, when the weather on the lower hills is comparatively dry and fine. September and October are uncertain months, depending on the state of the south-west monsoon which, if begun early and exhausted, renders the weather fine, warm and pleasant, but if deficient in previous rain, a good deal of mist and drizzle generally prevails. Towards the end of September the wind again begins to shift round to the north, when the weather becomes suddenly colder, mists and fogs are common throughout the year. Some gales of wind occur once or twice a year, generally about the changes of season, but thunder and storms are of rare occurrence. The changes of temperature are sudden.

"On the lower ranges, the village of Thandigoody is situated about eighteen miles distant from Vilputty and about twenty-six from Poombary on the eastward. It is about 5,600 feet above the level of the sea. The climate is here much milder than on the upper plateau. The air is moister and the nights less cold. In June, July and August the weather is clear, bright and fair, while on the upper hills there is

much drizzle or rain. This difference arises from the former place being less subject to the influence of the south-west monsoon. Less rain falls at this place, and it is often dry here when it rains to the west.

"The Virupatchy villages are situated on a plateau between Thandigoody and the plains. Its elevation varies, the higher village being from about 5,000 to 2,500 feet above the sea; its temperature is higher than on the west range and Tandigoody."

Geological Formation.

The rocks on the hills are gneiss, over which is generally found a stratum of clay, white and yellow, of different tints, the whole covered with a coat of vegetable mould. On the tops and slopes of the hills, the soil is seldom found more than a foot or two in thickness; but in the valleys it sinks to a greater depth, and towards the rivers and creeks a rich alluvial soil is found, containing a large proportion of silicious sand, mixed with mica. In some parts a ferruginous and calcareous kunkar prevails, but the former predominates; being found in some places on the surface, and in others some feet below.

The whole of the elevated lands of the west division is uncultivated. In the valleys near the villages, cultivation is more extended; here the red soil is intersected by rivulets and rivers, and in some places large morasses. The eastern parts are more productive than the western, having a considerably larger portion of fine rich loam, and being less exposed.

Salubrity.

The higher ranges are decidedly salubrious, and the inhabitants are robust and healthy people. The most unhealthy seasons with them are the cold months when catarrhs and occasional fevers from exposure are met with; small-pox of a fatal character has carried off many of the natives; with Europeans, there is a predisposition to catarrhal affections from April to June. But taking it all in all, there is no other climate in India more congenial to the feelings, more calculated to preserve health, or to restore the invalid, than is found on this elevated area. I believe it is calculated to promote recovery in all, save the exceptional cases of diseases of the heart and those affections of the lungs, where the stimulus of the rarefied atmosphere would be injurious.

Already, at a place called Kodakarnal, some of the Civilians of the District of Madura have built houses, to which their families resort. But these hills deserve to be more frequented by Europeans, who with their superior knowledge would speedily introduce comforts and preserve their constitutions against the diseases incidental to a prolonged residence on the plains.

With Telegraph to the summits of our mountains and Railways, or even good transit communications to their base, many of our healthy

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European Corps might be located on them, rather with the view to maintain health than to renovate it; and still be as available for duty as if they occupied the posts they now do.

It is in contemplation to build Barracks for our European soldiers at Trichinopoly; I trust before this step be decided on, the advantages of placing them on this attractive region may be considered. The additional expense incurred would be fully counterbalanced by the favorable results which might be confidently anticipated.

SECTION III.

The Neilgherry Hills.

The Neilgherries, properly so called, comprise two distinct tracts of mountainous country, one denominated the "Neilgherries proper," and the other the "Koondahs." Thirty-eight years have now elapsed since Mr. John Sullivan, Collector of Coimbatore, was tempted to make an excursion to these wild regions at the solicitation of the hill people themselves, who invited him to visit their mountains, where they informed him that "It is so cold that water becomes transformed into glass." Mr. Macleod of the Civil Service shortly after this, penetrated into these hills, and many Burgher's children who were born during his sojourn there, were called after him and retain the name of Macleod to this day. The result of his visit was the establishment of that delightful sanitarium "Ootacamund."

Topography.

There is no table land of any extent on the summit of these mountains, but ceaseless undulations prevail over the whole surface, breaking into abrupt rocky ridges. These are smooth and grassy to a degree seldom observed in mountain tracts. The summits of these hills are scantily wooded. Forests occur in isolated patches and in hollows on slopes descending in an abrupt manner from the crest of a mountain along the valleys into the plains below.

The Neilgherries run north-west and south-east; the highest mountain is that called Dodabetta, being 8,610 feet above the sea. Like the Shevaroys, the Neilgherries rise abruptly, presenting the same comparatively isolated masses upheaved amidst the plain. From their central position, their great elevation, the salubrity of the climate, the evenness of their seasons, they possess perhaps greater advantages as a sanitarium for European troops than any other hill station in India, and they will on this account become, probably, at some future period, the resort of the European invalid from the Bengal and Bombay as well as the Madras Army.

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The following table exhibits as correctly as I have been able to ascertain the mean temperature of each month, the height and the average fall of rain on the several mountains and hill stations already occupied or brought to notice in India.

Presidency	Names of Hills or Hill Stations.	Mean temperature in January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Ascertained heights.	Average fall of rain per annum in inches.	Remarks.
Bengal Presidency.	Derjeeling...	40	41	51	55	61	62	63	64	63	55	50	44	8,008	$12\frac{5}{4}$	
	Simla...... ...	40	44	53	61	66	80	75	78	70	67	52	46	8,000	70	
	Landour	35	40	51	...	...	...	...	68	64	49	46	46	7,300	...	
	Muree	...	...	...	...	...	69	68	66	62	62	...	...	6,786	...	
	Kussowlie ...	42	47	58	64	77	73	70	70	72	66	...	...	6,400	70	
	Nainee Tal...	42	46	56	61	69	69	67	69	65	61	50	47	6,200	$82\frac{1}{2}$	
	Dugshai... ...	42	47	57	64	69	71	72	68	66	62	54	53	6,000	70	
	Subathoo......	...	...	...	77	81	84	79	77	...	...	...	...	4,000	70	
Madras Presidency.	* Ootacamund	54	56	60	61	61	57	63	63	63	56	54	53	7,361	60	* Situated in the Southern Division.
	* Kotagherry	59	60	61	63	63	64	65	65	64	62	60	59	6,100	55	
	* Jackatalla	59	61	67	68	68	64	70	70	70	63	61	60	5,840	50	
	* Coonoor ...	60	62	68	68	68	65	70	70	70	65	62	62	5,761	50	
	* Pulneys ...	51	53	60	61	Averages 25° under that of the plains.								7,000	...	
	† Annamallys	..	...	...	...	...	...	...	...	66	56	...	...	6,800	...	† Do. Malabar.
	‡ Shévaroys	65	65	68	71	71	68	68	68	67	66	66	65	5,260	40	‡ Do. Centre Division.
	§ Ramandroog	70	76	80	80	75	73	71	70	70	71	71	67	3,400	46	§ Do. Ceded Districts.
	‖ Cheluldahs	60	60	70	83	83	71	...	...	...	...	71	71	3,600	...	‖ Do. between Secunderabad and Nagpore.
Bombay Presy.	Mahbleshwur	63	65	72	74	72	67	63	64	64	66	64	63	4,700	$239\frac{3}{4}$	These hills are not occupied during the rains. There is therefore no record of the fall of rain.
	Poorendhur...	67	73	77	78	73	70	67	65	67	71	69	64	4,200	$72\frac{1}{4}$	
	Matherun ...	Temperature throughout the year about 10° under that of Bombay												2,500	...	
	Mount Aboo	61	61	69	77	77	77	69	69	69	69	69	71	4,015	$78\frac{1}{4}$	

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It will be observed from the above table that the nearest mountain sanitarium available for the sick and convalescents from Calcutta, is Darjeeling, distant about 400 miles; but as the average annual fall of rain there exceeds 10 feet, that circumstance alone will prevent its becoming a place of general resort for the invalid. Nainee Tal and Simla, even with the aid of Railways, are too distant from the Lower provinces of Bengal to expect that these stations will ever be made generally available for invalid soldiers from thence.

On the Bombay side, level space on Hill plateaus is limited, and, even were space sufficient, the annual fall of rain is so great that it is necessary to abandon them for months together. Their altitude also is below what many invalids require.

But the Madras Presidency in these matters is singularly favoured. Majestic mountains, nowhere in the world surpassed in beauty, possessing table land to a large extent varying from 3,000 to 8,000 feet above the sea, with an abundant supply of good water and a climate surpassing in salubrity any in the globe, stand up in the midst of our vast plains, and the Railway will shortly enable us to turn these not only to our own account, but also to that of the other Presidencies. The sick soldier, in the one case, conveyed by sea from Calcutta to Madras and in the other from Bombay to Beypoor, having already received benefits from the voyage, may be transported without fatigue or delay, to the magnificent climate on the summits of the Neilgherries where there is everything to exhilarate the mind and thus favorably affect the constitution of the invalid.

Geology.

The description of the Geology of the Neilgherries by Principal Inspector General R. Cole has been pronounced by Mr. Blanford of the Geological Survey "as very excellent." From this report I glean that the mass or foundation rock is granite, and that it is almost always in a singular state of decomposition, nor is it possible to say how deep into the mountain this decomposition is going on, for in the deepest sections that have been made the process is still observed. It is evidently quite independent of atmospheric influences, and would seem to be the effect of a continuous chemical action. It is partly, no doubt, from this mode of decomposition that the hills acquire their rounded form, the surface rock itself becoming, when exposed, disintegrated still further by atmospheric influences.

Over the whole surface of the plateau is a fine vegetable mould, varying from two to ten feet in thickness, in some parts of a brown and in

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others of an intensely black colour. The latter in appearance assimilates to the "regur" or cotton soil of the plains; but in chemical composition the two differ. Immediately under the vegetable soil, is a layer of gravel varying from a few inches to several feet in thickness.

The great mass of the hills is under grass—the surface in most places perhaps never disturbed. The frosts which occur at the close of the year, kill the grass to the roots, and the decomposed vegetable matter, mixing with the sub-soil or washed down into the hollows by the rains, continues season after season to increase the richness of the soil.

From the abrupt manner in which the sides of the plateau descend to the plains, it would appear as if the general upheaving force had been exerted on the whole region, elevating it at once so gradually to its present altitude, as merely to disturb the surface only so far as to produce the undulations observed.

On a subsequent exploration, Mr. Blanford dissented from these views by Mr. Cole; pronouncing the Neilgherry rocks foliated and metamorphic, not primitive or eruptal; except occasional dykes of trap being found, especially on the Khoonda range.

Streams of water of the purest quality flow at all seasons all over the hills, and springs arise from every hill side.

Meteorology.

The prevailing winds on the Neilgherries are the north-east from October to March, and the south-west from April to September. The greatest fall of rain takes place during the south-west monsoon. The coldest season is during the months of December and January, and the hottest about April and May. The hottest period of the day is about *2h. 40m.* P. M.; and the extreme range of temperature from sun-rise to that time averages usually 16 degrees throughout the year. In the coldest month the thermometer seldom falls below the freezing point, and in the hottest, seldom ascends beyond 75° in the shade. Owing to the great elevation of the inhabited summits, and the consequent rarefaction of the atmosphere, aided also by the influence of the vegetation which clothes them, although only 11 degrees from the equator, the salutary effects of the climate is surpassed by no mountain within our knowledge.

Inhabitants.

The population on the Neilgherries are composed of—

Todars, males and females, about			300
Burghers	do.	do.	5,000
Kothers	do.	do.	300
Eurelars	do.	do.	400
Coorumbers	do.	do.	not known, a small number.

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The utmost obscurity hangs over the early history of the Neilgherry Hills. There are numerous "cairns" or rude tombs on their summits, the origin of which is so remote that the Todars, recognized as the most ancient inhabitants, have no tradition which would guide us to a surmise even of the people by whom they were constructed. These tombs are circular; they vary from 12 to 30 feet in diameter, and are formed with large blocks of unhewn stone usually raised above the ground, and contain coarse pottery, ashes, calcined bones, figures of animals, and sometimes pieces of metal; but neither coins, inscriptions, nor images have been found.

With the Todars commences, therefore, the only known history of these mountains. In stature, the men are tall and muscular; they have a bold and independent carriage, while their aquiline nose, receding forehead, and rounded profile, with their long black hair and beards give them a decidedly Jewish aspect, and impress one with the idea that they may be connected with one of the last tribes of the ancient Israelites. I was much struck with the similarity they bear in many respects to the black Jews at Simperapool, regarding whom there are conjectures of a similar nature.

The women are of a dull copper hue, tall, handsome in features as well as in person. Their long hair is parted in the middle and allowed to flow in ringlets over their shoulders. They are frank in disposition, and are remarkable for a great flow of spirits, unusual to the Asiatic.

The occupation of this singular people is solely of a pastoral kind. They have large herds of buffaloes, and their "munds" or villages, which seldom exceed three in one spot, and a fourth set apart as a place of worship in which they keep their grain, ghee, milk, &c., resemble in shape the arched roof of a waggon having a low and narrow door in the centre.

The Todars allege that they held possession over the entire plateau of the hills by ancient right, and in virture of this, they exact from the other tribes, one-sixth of every description of grain produced.

The Kothers rank next to the Todars. They are of the Pariah caste, live in isolated villages, and are an exceedingly industrious and useful race; they cultivate the soil, work as laborers and artificers.

The Burghers come next in order. They arrogate to themselves a right of direct proprietorship over the entire Hill-plateau; but admit the fact of their holding it under tribute to the Todars. In character they are deceitful, ungrateful, and false.

The Eurclars assert a proprietary in the lands which extend below the plateau of the hills, and inhabit principally the eastern portions.

The Coorumbers are wild and uncouth in appearance, and small in stature. They are held in superstitious dread by the Burghers, to whose sorcery they ascribe all misfortunes which befall themselves, their cattle or their crops.

There are at present four settlements on the Neilgherry Hills, viz., Ootacamund, Coonoor, Kotagherry and Wellington or Jackatalla. Ootacamund is the chief station. On account of its superior elevation it is the coldest; and to an invalid long resident in the plains the immediate change to the penetrating cold of Ootacamund is too great and sudden. In clear nights, the radiation produces excessive cold, and towards morning, the ascending rays of the sun, shining through rarified atmosphere, speedily restore heat to the earth, causing the temperature of the air to rise in proportion, and so it continues until sun-set, when the thermometer again speedily falls. Thus, to all new comers especially, the utmost caution is required in encountering these alternations.

Civil Dispensary.

Two Medical Officers appointed by Government, afford medical aid to the residents at this settlement. The senior has also charge of the Civil Dispensary. Here fifty-seven average daily sick are treated; fifteen usually occupying beds in Hospital. The prevailing diseases are fevers, contracted around the base of the hills, catarrh and diarrhœa. The class of natives treated are chiefly those from the low country. The Burghers and others resident on the hills, have an aversion to enter hospital. But generally speaking, all parties resident on these hills for any length of time, enjoy robust health; showing that the genial effect of the climate and its pure atmosphere has an equally invigorating effect on the native as on the European constitution.

The most prevalent disease amongst the aborigines, is small-pox. This scourge often carries off whole families in a brief space of time. There is no Vaccinator attached to the hills. The introduction of a proper Vaccine establishment would be a great blessing to the district. A Vaccinator visited the station from Coimbatore in July last.*

General Dispensary.

The increasing population at Ootacamund, and the many professional calls on the time of the Medical subordinates, call for further aid in this department. I am assured that the Assistant Apothecary's time is almost entirely taken up with work, which an ordinary Writer might perform, and that unavoidable delay in making up prescriptions has been sometimes productive of serious results.

* Since the above was written this want has been supplied. There is now (1862) a Native Vaccinator resident on the Hills.

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For some years past it has been the practice to hold annual Committees on public servants under the Madras Government, who happen to be resident on the hills for a period of upwards of twelve months with the view to ordering them back to their duties if sufficiently recovered.

This rule does not affect public servants of the other Presidencies resident on the hills, nor does it bear on Officers proceeding to England or elsewhere than the hills on sick leave. They enjoy all the advantage of the original leave granted. I am of opinion that this rule should be annulled, as it operates injuriously both to the patient and the public service. Its abolition would save the Medical Officers from a very invidious duty, and the Medical subordinate from a portion of the scriptory labor, which is already too voluminous. But should my views not be entertained, I would then urge that the period for the assembly of the annual Committee be altered from the 15th January. Before the names of those reported fit for duty appears in G. O., and the usual period allowed to prepare for their journey has elapsed, it is near the end of February, when they can leave the hills. Thus, after passing through the coldest season on the hills, they return to the low country, just to encounter the commencement of the hot season, with perhaps a long march before them. This sudden change is injurious; the 1st October is a more desirable period for the assembly of the Committee.

Coonoor Dispensary.

The station of Coonoor is the mildest and the most equable of climate on the Neilgherry Hills. It is 5,760 feet above the sea and 1,600 feet lower than Ootacamund. The climate of Coonoor, on account of its mildness, is best suited for the invalid, for the first few weeks after his arrival on the hills; but even in this milder climate, precautions in regard to clothing and exposure are necessary to guard against any evil results which might arise from the transition from the low country to so elevated a region.

The Dispensary was opened in September 1855. In that month, 91 sick received relief. In July 1858, the number treated amounted to 257; on an average 42 are treated daily. The prevailing diseases are fevers of the remittent type. These are of rather frequent occurrence, in many instances having their origin at the station or its neighbourhood. Vaccination is not kept up, even imperfectly. A native Vaccinator visits this station once annually. The Medical Officer of the

station uses the extract of the root of the hill Barbary as a substitute for Quinine in fever, and with very good results.

A strict observance of conservancy regulations is much required at this settlement. There is a vast deal of filth about and around the bazars, and a system of drainage, which might be introduced with ease, is much required. I have no doubt that local disease is engendered from the absence of responsible supervision on this point. At certain stations on the Bombay side where the only public Officer is a medical man, I believe he is vested with administrative authority. The same system might be introduced with advantage into this and some other of our hill stations.

Wellington Barracks.

The noble range of barracks at this station can accommodate with ease 1,000 men. They are constructed in a form of parallelogram, on a plateau 5,860 above the sea, and 1,500 below Ootacamund. The range of the thermometer at Jackatalla is usually 7 degrees under that at Ootacamund. The country around the Cantonment is bare of wood; but a forest of young Australian trees is rapidly springing up in the neighbourhood, and it is in contemplation to carry out this system of planting extensively, which will doubtless be a vast benefit to the place. The barracks have been constructed with a due regard to ventilation, and every comfort has been introduced into the buildings, which are two stories high.

Commodious quarters for married men have also been constructed; but the strictest attention is required, while so many people are at work on the buildings, to preserve cleanliness. For, if surface filth accumulates, the place may become so polluted as to establish a malarious atmospheric taint, which will hereafter be a source of disease. Indeed, the effect of this neglected conservancy has already begun to exhibit a noxious influence on parties residing there.

Sewage.

The great difficulty at Wellington, is the removal of the sewage from the barracks, &c. Four plans have been proposed.

1st.—The formation of one or more lakes in the ravine and valley through which the Coonoor river flows, into which the night soil conveyed by pipe would pass.

2nd.—The removal of the night soil (deodorized by peat-charcoal) by means of carts to a distance from the barracks.

3rd.—The removal of the sewage by means of pipes into the Coonoor river, from whence it would be carried onwards by the streams.

4th.—The removal of the sewage by pipes into the ravine, but not into the stream, and from thence on by closed main conduit to a point beyond the station of Coonoor, a distance of two miles, there to discharge its contents into a cascade. The river from this point flows by a steep decline down the ghaut, a distance of twelve miles, receiving in its course several tributaries and finally empties itself into the Bowany.

To adopt the first plan would be merely to create endemic sources of disease, for the proposed lake would speedily become a cesspool.

The difficulty of removing the night soil by carts to a sufficient distance, and the danger of impregnating another position by impure exhalations, are sufficient reasons for not putting the second plan into force.

The third plan would pollute the pure mountain stream which alone affords a water supply to hundreds of followers in the bazar of Jackatalla and to the inhabitants of Coonoor. This plan has been already sanctioned, and to a certain extent carried out.

The fourth of the above plans is without doubt the only perfect system to adopt, consistent with sanitary considerations. By it the night soil will be received into a closed main conduit by a system of intercepting pipes from the barracks, hospital, Sanitarium Depôt, married men's and officers' quarters, and will be forced by the pressure of water from above, through a long culvert, to a point beyond the reach of doing injury by contaminating the stream or the atmosphere. In September 1858, I reported as follows :—

"Nothing can be more noxious or offensive than the present *no*-system. There have been nearly 3,000 people at work daily at Jackatalla for many months past. There is no permanent Officer in Command. There have been no fewer than fifteen since May 1854, so that there has been no local responsible supervision; the consequence is, that the Cantonment and neighbourhood is tainted with a fœcal atmosphere. Go where you will in the unfinished buildings, in court yards, even in the very rooms, human ordure is found; already the result of this neglected conservancy is exhibited in low fevers in European children and grown-up people. The coercive interference of Government is therefore required to preserve the character of the station for salubrity."

In March 1861 I made the following observations on the same subject. "From the period that attention was particularly paid to the removal of these causes of disease, a rapid improvement became evident in the health of the men. The mortality in H. M.'s 3rd Battalion 60th

Rifles, nearly 1,000 strong, during the past year, has not exceeded 0·87 per cent., which will vie with the most salubrious place in any part of the globe; and during my sojourn for upwards of a month on the hills, the average daily sick were only twelve, most of them being trifling cases. These circumstances attest to the sanitary excellences of a hill climate for European soldiers, and to the beneficial effects of a good system of hygiene, presided over by the Medical Officer in charge of the station."

"There remain however certain sanitary defects which call for improvement. The first is—the defective arrangements for the removal of the contents of the privies, &c."

"This is done by an extravagant Scavengerage establishment. Solid night soil is conveyed up an ascent and deposited into pits about a mile north-east of the barracks. This is unapproachable from stench; and I fear that as the deposit increases, the barracks may experience the baneful influence of the locality as the wind passes over it to these buildings for many months during the year; or, by the flooding of the pits during the rains, the filth may be spread over the surface, thus permanently endangering their salubrity; added to this, the urine tubs are at present emptied down the slopes some 200 yards from the plateau occupied by the barracks."

"A proposition is, I learn, now before Government for the formation of a line of rail or tram-way to convey the filth to the pits indicated above. In course of time, from the causes indicated, I believe the proposed system would have to be abandoned. In communication with the Executive Engineer in charge of Wellington Cantonment, and after very carefully weighing the several systems of sewerage proposed, we arrived at the conclusion that the best and least expensive is the following:"—

"Take advantage of the present line of road to Coonoor, which is in length about two miles from the barracks. Lay a rail or tram-way on the right bank of the Coonoor river and bridge, from whence carry it around the path encircling the hill about a mile further; solid and liquid deposits to be removed in iron vessels by three conveyances and thrown down a precipice. The conveyances in returning to Wellington could then take back to Coonoor, regimental and bazar supplies. In connection with this plan by means of a large supply of iron pipes now on the spot, an efficient system for the removal of liquid sewage from the lavatories and urinals united, can also be brought into force."

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Regimental Bazar.

"The second point I would remark on is, the state of the Regimental bazar at Wellington. Before doing so, I would refer the Principal Inspector General to the observations made by me in my former report on this subject. I cannot learn that any plan for the erection of houses in this locality has been adopted. Squatters appear to be settling down where and how they please, regardless of sanitary laws, of any approach to uniformity, or the means of ensuring drainage. There is a good supply of water at all seasons for scouring the drains; but houses are erected which will obstruct the lines of drainage. It is necessary that a plan be laid down on sanitary principles which should not be deviated from. No cattle should be penned at night within the bazar, and no dung-heaps allowed."

The healthy hue and muscular development of the men of the 3rd Battalion 60th Rifles stationed at Wellington, is a subject of general remark. When I first saw the corps on their arrival in India, in December 1857, they were then a weakly looking set of lads. During 1858 they were stationed at Bangalore. For some months after their arrival on the Neilgherries, they suffered considerably from low fevers and bowel disorders. But now, as a body, they would vie with any corps in England in vigor and muscular development. And this, I believe, is due solely to the healthy influence of their mountain residence and their constant outdoor occupation either on the Public works, in the Regimental garden, which is in a very creditable state of progress, or in their own individual occupations.

There are other two measures which I would earnestly urge for the consideration of the Principal Inspector General with the view to the hygiene of the station.

First, the enclosure of the extensive ravine situated to the southward of the barracks and lying between the barrack-hill and that selected for the Convalescent Depôt (which is at present the most offensive spot in the Cantonment), with the view to its conversion into a Soldier's orchard and a vegetable garden.

Secondly, that the bazar, now in course of formation contiguous to the barracks, should be erected on a distinct plan, with houses as much as possible on an uniform pattern, and with streets so formed as to permit of free ventilation and drainage, in order that we avoid the usual teeming sources of disease which so closely and fatally encircle our Indian bazars. The space allotted for the bazar is too circumscribed, but it is capable of being extended on a piece of waste land situated to the west of its present site.

In the centre of the barrack square, two rows of trees, with a path between, and a fountain in the centre, would induce the soldiers to leave their barracks during the day and take exercise under their shade, where seats could be placed.

The inestimable advantages which our European soldier derives from a residence on hill-stations, both as a prophylactic and as a remedial agent, are not yet sufficiently recognized. In a paper recently read at the Society of Arts (London) by Mr. Hyde Clarke, it was shown from data collected at the East India House, that the hill climate of India is fully as good as that of England, and the deaths of European soldiers on them are as one to two compared with the plains ; and His Excellency Sir Patrick Grant, in a Minute on the subject of establishing a Convalescent Depôt for European soldiers at Jackatalla, states " that in 1847 a searching investigation in the Bengal Presidency by a mixed Committee of highly experienced Medical and Military Officers, established the fact that the ratio of mortality amongst European soldiers was fully 50 per cent. less on the hills than it had proved on the plains." On these grounds, His Excellency recommends that a Convalescent Depôt for European soldiers be erected on a very eligible site at Jackatalla, calculated to accommodate 400 men and their families, from the following stations :—

Bangalore, a station for	2	European Regts, and	European	Artillery.
Trichinopoly	do.	1	do.	do.	do.
Cannanore	do.	1	do.	do.	do.
Madras	do.	2	do.	do.	do.
St. Thomas' Mount					do.

Wellington is well sheltered by the Dodabetta range from the dry, cutting, northerly winds which set in in October, and the rains of the south-west monsoon are neither so incessant, nor is there so much mist and damp as is experienced during the same season at Ootacamund.

Some of the convalescents now there, are dressed in their white jackets and trowsers, others in their regimentals. I think it would be attended with advantage if a supply of clothing suitable to the climate, such as the ordinary shepherd's plaid, or some other pattern of Scotch tweed, were at all times kept in store, and issued for the men on arrival at this station.

Our experience of Jackatalla, as a station for European troops, is as yet too limited to enable us to form conclusive data on which to draw a contrast between the health of European troops located there and else-

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where. The chief class of men who have hitherto been sent to Jackatalla, are sick and convalescent from several Regiments; and there are now sick Details from seven European Regiments and from a Troop of Horse Artillery.

During the years from 1854 to 1857, inclusive, the greater number of Her Majesty's 74th Highlanders were stationed at Jackatalla, with the view to aid in constructing the barracks. The men lived in temporary huts, hastily erected for their accommodation, without boarded floors at first, which gave rise to bowel disorders; but as soon as boards were placed on the floors and they were more comfortably housed, they rapidly shook off the disease.

A very eligible site has been selected in the neighbourhood of Wellington for an European Prison. I beg to suggest that a Lunatic Asylum for Europeans be also placed on the same locality.

Kotagherry Dispensary.

The settlement of Kotagherry is seventeen miles from Ootacamund, and twelve from Jackatalla, it is admirably protected from the violence of the south-west monsoons by the Dodabetta range. In altitude it is 6,100 feet above the level of the sea, 1,261 below Ootacamund, 340 above Coonoor, and 240 above Wellington. It possesses a charming climate, a happy medium between the other settlements on the hills, and it is considered peculiarly favorable for convalescents from dysentery and diarrhœa, and is considered to be the best climate on the hills. A resident Apothecary has charge of the Dispensary, and the station is visited periodically by the Medical Officer of Coonoor. Although, in point of climate, Kotagherry is preferable to any of the other stations, it is, as yet, the least resorted to, and there are only at present five permanent residents there. Coffee cultivation is carried on to a considerable extent on the slopes adjoining this station, which merits more encouragement than it has hitherto had. The acknowledged great want is a resident Medical Officer, and as an Assistant Surgeon forms now one of the permanent Staff at Wellington, which is only distant from Coonoor two miles, I think, on the termination of the tour of the present Medical Officer at Coonoor, his successor should be stationed at Kotagherry, one of the Assistant Surgeons at Wellington performing the duties at Coonoor, in addition to his own.

Kaity.

Shortly after the Neilgherries became a place of resort for the European invalid, the expectation that the products of our more temperate climate might be raised without difficulty on these mountains, led to the establishment of a Government Farm on an extensive scale in the Kaity valley.

distant from Ootacamund four miles, the project was however eventually abandoned, the return having proved less than was anticipated. This valley is now the property and the head-quarters of the Basel Evangelical Missionary Society, and a place of retreat for such laborers of the Mission, as have lost their health in the prosecution of their duties in the plains.

The prevailing diseases on all hill-stations, are bowel complaints and sometimes fever.

Dr. Grant of the Bengal Medical service, in a paper on hill diarrhœa and dysentery, published in the Indian Annuals for October 1853, has shown that bowel disorders usually prevail only in the first season during which troops occupy hill-stations; and that subsequent years display not only an immunity from this, but also from other disorders.

Fever, as a general rule, is rarely seen on the hill-stations. That malaria exists in the neighbourhood of deep ravines and confined gorges, which intersect all hills, is acknowledged, and that miasmal exhalations, generated in such places, are found occasionally to ascend in certain states of the atmosphere after a long period of drought, is a recognized fact. But it is an arbitrary style of reasoning to advocate, as is usually done, that there is a certain "fever range" on all mountainous regions in India, beyond which the specific morbific influence cannot ascend. Dr. Grant asserts, "that primary cases of intermittent fever are by no means uncommon at Simla (8,000 feet above the sea) and the neighbouring stations, as also with occasional cases of the worst form of typhoid remittent"; but the malaria is not powerful enough to excite periodic fever. It seems to ascend from the numerous deep ravines and water-courses which intersect these stations; but to be so diluted or changed by the effect of elevation, cold and moisture, as to cause bowel complaints instead,—and this is exactly what occurs in some mountain ranges in some other parts of the world where we observe bad remittent fevers at the level of the sea, intermittents at a higher level, bowel complaints higher still, and at the highest, ulcers which appear as the feeblest result of malarious poisoning in depressing the vital powers. Dr. Aitken, on duty on the Neilgherries, informs me that he has seen very severe cases of jungle fever originating at Ootacamund, which is 7,300 feet above the sea; and at Coonoor, whose elevation is about 1,500 under this, fever is by no means uncommon. Fever also occasionally appears on the Shevaroy Hills, which possess about the same elevation as Coonoor. There are other mountain ranges with lower elevations than either of these, where fever is seldom seen, as at Ramandroog

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in the Ceded Districts, Mahableshwur and Poovenshur, on the Bombay side.

It is evident, therefore, that there must be some exciting causes influencing febrile affections and bowel disorders on certain hill-stations, other than malaria. Dr. Grant remarks, that trees have in some places gained the repute of producing endemic disease, by reason of their promoting damp exhalations and preventing the free circulation of air, or the admission of light. Doubtless, it is necessary in all cases to keep down thick jungle, to thin the trees, to lop off their branches for several feet above the roots, and prevent exuberant vegetation below. If these simple matters be attended to, the presence of trees in any number will induce beneficial instead of noxious results. The conclusions of experience are, however, in favor of selecting grassy sites, clear of trees and jungle. On these, when occupied, trees ought to be planted, in order to give shelter and promote humidity to a certain extent.

Dr. Grant further states, that the best founded and most influential exciting causes of disorders of the above order, are to be found in the cold moist atmosphere, and the great and sudden vicissitudes of temperature by which perspiration is checked, leading to internal congestion, with languid and impeded circulation in the large organs. The best means of guarding against these zymotic influences are warm clothing and active exercise in the open air.

In an able paper* by Dr. Heyne, late of the Madras Medical service, it is stated, "that when the temperature is increased more than usual, when the surface of the earth is exposed to the meridian rays of the sun, it is the epoch, when the large development of the elastic fluid, electricity, is speedily dissipated from the place in which it was confined, producing a powerful influence on the animal constitution." All fevers are in Dr. Heyne's opinion "in some degree engendered by a superabundance of electricity, either of the local situation or of the habitude of the individual." To the same cause may be attributed that cachectic state of the body marked by anæmia, soreness of the gums and other debilitating influences of a scorbutic taint, which is not always dependent upon the want of vegetables. A sea voyage is known to have the best effects on those who have thus suffered, probably because it restores the equilibrium between the different electricities. In support of this theory, Dr. Heyne describes the mode which has been sometimes adopted to cure scurvy, when a change of diet was not

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* Madras Quarterly Journal, Vol. vii.

attainable—"the patients are put up to the neck into the first ground that can be found and kept there for twenty-four hours, and this restores them to health. The advantage derived from this proceeding, is doubtless owing to the electricity absorbed from the earth in which it is supposed to circulate." Dr. Heyne further asserts, that the spleen, the parenchymatons structure of which resembles the evolving body of the electric-cel and torpedo, is the organ which is most likely subservient to the distribution or assimilation of electricity in the animal constitution. The reduction of its size in scurvy and beriberi (an anamalous species of scurvy) would indicate a deficiency of that principle in this disorder, while the increased size of the organ in those who have suffered much from fever would indicate the presence of a superabundance of it.

The vulgar of most countries blame the spleen generally for all mental disorders, which the expression "splenetic" evidently indicates. The rays of the moon, probably by disengaging the atmospheric electricity, possess an influence on the human body, as is exemplified in persons prone to fever, or in maniacal patients.

According to Dr. Heyne, the hills where fever is found to prevail with most intensity are those composed of granite, the most common rock on this globe. This rock contains besides quartz, felspar and mica, a great proportion of ferruginous hornblende, which, by its disintegration or separation from the rock, becomes highly magnetic.

By the same authority, the hills which are constantly free from hill-fever, are those known to Geologists as primitive trap, "which consists of quartz, felspar and real hornblende." Dr. Heyne sums up his able paper by asserting, that the hill-fever on this coast exists exclusively among the hills of the granite formation, or where iron is found in large quantities.

There has not been anything like *epidemic fever* amongst the European inhabitants on the Neilgherry Hills, since their occupation: now nearly forty years ago. There have been doubtless occasional severe sporadic cases of remittent fever; but these can usually be traced to distinct causes, as accidental mephitic influence, or the ascent of malaria under certain peculiarities of the atmosphere, unknown to us, from the deep ravines, water-courses and marshes. But this malarious influence usually becomes so diluted or changed by the effects of elevation, cold and moisture, as to cause bowel disorders instead of intermittent fever. This circumstance with other causes, already detailed, makes diarrhœa the prevailing disease on hill ranges generally.

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The climate of the Neilgherry Hills is peculiarly favorable to children of European and East Indian parentage. That of the station of Ootacamund, on account of its sudden changes, is the most trying during the cold winter months; affections of the air-passages are of common occurrence, and at times severe in their effects. The climate of Coonoor is not sufficiently invigorating as a residence for children; but that of Kotagherry, so far as our experience enables us to form an opinion, is unquestionably the most favorable climate for their growth and muscular development. Here, acute attacks of disease are almost unknown, and the usual infantile diseases are of the mildest nature. Here also children of mixed parentage derive much benefit, becoming as robust in bodily and mental activity as European children.

It is asserted that in the debilitating climate of the plains, one child only in five is found to survive the fifth year of sojourn there. The necessity of maintaining for the future an increased number of European soldiers in this country, renders the establishment of an institution for the training of their children very desirable. The settlement of Kotagherry from its climate and its readiness of access, when the proposed new road has been constructed from the Railway terminus, appears to me to have all the elements necessary for the establishment of a colony; from which, at a future period, a race of strong healthy Anglo Indian recruits might be drawn for our European Regiments, and other honorable and useful employments; and a commencement might very advantageously be made by removing to this place the Madras Male and Female Asylums.

In conclusion, I would beg to draw the attention of the authorities to the state of the bazar of Ootacamund. This station is daily increasing in extent, and as it increases, so does the native bazar extend. Hitherto houses appear to have been erected at the will of the occupiers, and streets formed without regard to drainage or to ventilation. The lake is also being rapidly encroached on by the accumulation of refuse and filth on its banks; the same being first turned into garden-ground and afterwards into building sites. I would strongly recommend the removal of the slaughter-houses from the bazar to the extreme end of the lake near the water-mill.

SECTION IV.

THE ANNAMALLAY HILLS.

The eastern ghauts are intersected by several deep valleys, but in only one place are they completely divided. This opening denominated

the Paulghaut Pass, is shaped like a funnel with its narrowest end towards the east, and is almost in a direct line between Trichinopoly and the Travancore country; so soon as the west wind begins to prevail on the coast, a free and full passage is thus granted for its passage into the province of Coimbatore, where it exercises a very beneficial influence.

Jail and Fort, Paulghatcherry.

Until lately, a Regiment of Native Infantry and a Detachment of Artillery garrisoned the Paulghaut pass. Now it forms the head-quarters of a Sub-Collectorate; and the Fort, which is placed on a somewhat elevated ridge in the centre of the pass, is occupied by a Detachment of Native Infantry under an European Officer. Here also the Jail is placed; the average number of prisoners being 100. These have a robust and healthy appearance, and they have clean and sufficiently commodious quarters. The average number of sick seldom exceeds 5 per cent; they are accommodated in a small ill-ventilated room attached to the Jail, in immediate proximity to the healthy prisoners. This is objectionable, as on the occurrence of small-pox, or other epidemic disorder, there is great risk of the contagion extending. The Sub-Collector, in bringing this subject to my notice, solicited my aid in procuring an apartment more suited for the sick, detached from the Jail; in which recommendation I cordially concur. A native Dresser affords medical aid to the sick of the station.

Extensive Railway works are carried on at this station, it being the only opening throughout the entire range of ghauts by which the Railway can be conducted to the Western Coast from Madras.

The hills on each side of this pass present a rugged and bold outline. Running nearly parallel with the sea is the Annamallay range, and the general direction of the higher ranges, viz., the southern side of the triangle of the Neilgherries and the Annamallies, is nearly from west to east; while that of the more important smaller ranges is from north to south. Still smaller spurs and partly detached branches run off from these in every direction; and their occasional confused and clustered masses have, from a distance, an exceedingly picturesque appearance.

The sides of these hills are usually covered with jungle; but this is fast disappearing, as is also the belt of wood which formerly extended round their base in many places from five to ten miles broad—the ground on which it stood having been let to the cultivator for a long period of years on favorable terms.

In many places, although every tree and shrub which formed this dense forest has been removed, the ground still remains a barren waste; and I quite concur in the opinion of Dr. Cleghorn, the Conservator of

Forests (who accompanied me on this tour), that this indiscriminate removal of the trees has already exercised a prejudicial effect on the climate of the locality; the soil having now lost the benefit of the moisture which their foliage attracted and the evaporation which it checked.

Conservator of Forests Department, Toonoocuddoo.

On the Annamallay range of hills about twenty miles from the Paulghaut pass, and five or six from the plains, at an elevation of about 3,000 feet above the level of the sea, the Assistant Conservator of Forests has fixed his head-quarters. The ascent to this place is through a straggling forest of teak, black-wood and other jungle trees, many of which are of very large dimensions. The timber on being cleared or cut into planks is carted or dragged by elephants to the base of the hill, from whence it is either removed for Government purposes or sold by auction to the public.

Fever of a very severe character is usually present at the base of the mountain. But at Toonoocuddoo and in the forest it is less prevalent. The working season extends from July to January. During the remaining six dry months of the year, the forest is altogether abandoned. The fatal character of the fever which then appears in all its intensity renders this course necessary, some valuable lives having already been lost. The strength of the party who work under Captain Beddome, numbers, with axe-men, elephant attendants, &c., above 500, among whom are three European Overseers and some Indo-Britons.

Poolachee Dispensary.

Since the establishment of a Dispensary at Poolachee, which is at a safe and convenient distance from the foot of the hills, the sick of the Conservator of Forests' Department are removed there; and Dr. Cleghorn, the Conservator, reports very favorably of the extensive usefulness of the institution, both to those stricken down in his Department and to many others who, during the auction season, congregate from all parts of the country.

This Dispensary was opened in April 1857; a few influential Poligars of the district, foreseeing the inestimable advantages of an institution of this sort, contributed Rupees 5,300 by donation, and an annual subscription of Rupees 530 for its support. Government at the same time granted the services of a Native Surgeon, and sanctioned the requisite supply of medicines.

There was admitted into the institution during the first quarter after its establishment, 777 sick. During the quarter ending the 31st August last, 2,082 received medical relief. The prevailing diseases being fever, with its sequelæ anasarca, diarrhœa, and rheumatism. The sick are

now accommodated in a temporary building. But commodious, lofty and well ventilated quarters are in course of erection.

Vaccination is but imperfectly kept up. I recommend that the local native Vaccinator of the district be placed under the direction of the Native Surgeon, who is zealous in his work and possesses the confidence of the community. The Dispensary of Poolachee has already become a great boon to the large and populous district of country in which it is placed.

The Forest Department only occupies the western and lower portions of the Annamallay mountains. The more lofty, or, as these are usually denominated, the Delly range, have hitherto been unexplored. An unsuccessful attempt was made in 1850 by Captain Michael, of the 39th Regiment Native Infantry, to reach the summit, and he arrived at an elevation of 7,000 feet above the sea. In his report, he adverted to a valley of some extent about that altitude and of still higher ranges which he was unable to arrive at, which appeared to rise twelve or fifteen hundred feet beyond this. Considering it a matter of interest and importance to ascertain the extent of this valley and the capabilities of the hills generally as a place of residence for Europeans, Dr. Cleghorn, myself, and some others, commenced the ascent on the 15th September.

We selected this period, as there appeared to be a favorable break in the weather between the passing away of the south-west and the advent of the north-east monsoon.

The night before our ascent, we slept at Kotoor, a village six miles from the foot of the hills; to have encamped closer would have been dangerous; fever being always present at the base of these mountains. We reached the Annamallay river at day-light and crossed it in boats. This is a rapid stream, thirty to forty yards wide, formed by the confluence of the Toonoocuddoo, Ponnachee and other mountain torrents. About a mile from the river, we arrived at the foot of the ghaut, leading to the village of Ponnachee, passing on the road Elephant pits and other traps long in disuse. This pass, which is a mile in length, is too steep and rocky for horses to ascend. So we sent them back to the plains, performing the rest of the journey on foot. Four miles further on we came to the village of Ponnachee containing fifteen houses. This spot was ascertained to be 3,000 feet above the level of the sea. Descending from the village we arrived at the Toonoocuddoo river, which at this spot is a broad rapid stream, three to four feet in depth, and to judge from the water-marks on the trees, its depth must at times exceed six feet.

Following up the course of this stream, and about ten miles south from the village of Ponnachee, we reached a succession of cascades and a water-fall of considerable magnitude near the foot of remarkable conical peaks of bare rock which are observed from a great distance in the plains, called the "Ukka" and "Thungachee mallay" or the "elder" and "younger" sister.

The height here proved to be 3,500 feet; the ascent from Ponnachee being very gradual. Our course up to this point was south-west, and led through a thin forest of teak and other jungle trees and a good deal of bamboo, and open glades with grass five to six feet high. To judge from the appearance of the banks of the Toonoocuddoo river, after it passes Ponnachee, it is not improbable that a much easier pass into the hills might be made from the plains by following this stream; thus avoiding the precipitous ascent by which we reached the village, and shortening the distance fully one-half.

From the water-fall, the ascent was sudden in many places over steep rocks and through dense sholas. Still up the course of the Toonoocuddoo river until we arrived at a beautiful undulating valley between the Ukka and Thungachee mallay and Payrat mallay. In extent this valley is nearly equal to that of Ootacamund, and it varies in elevation from 6,000 to 7,000 feet above the sea.

The general appearance and character of these high lands resemble very much that found on the Neilgherries. Here are the same grassy-rounded eminences and dense sholas, extending continuously for miles, their edges ceasing abruptly. Conical hills and slopes covered with short rich grass, abounding with medicinal plants,—such as the ophelia elegans (gentian), and hymenodyction excelsum, a species of cinchona,—and vegetation precisely similar to that found there.

The heavy rain fell continuously during the period of our stay on these upper regions, evidently the breaking up of the south-west monsoon; the want of shelter, for there are no inhabitants in the higher altitudes, and the difficulty of procuring supplies from the low country, put it out of our power to proceed to the highest part of the range, which is apparently about twelve miles off in a south-east direction from the extreme point we reached, where, from the large streams of water which still descended to the north in cascades and water-falls to form the Toonoocuddoo river and the occasional glimpses which we had through the mist, I have little doubt that similar valleys or table-land would be found, we therefore reluc-

tantly returned to the low country without attaining our object, having been absent eight days. SERIES I. SECTION IV.

The best period to prosecute inquiry into the upper ranges of the Annamallay mountains would be after October, or in the hot seasons. From their position they are necessarily considerably under the influence of the south-west monsoon, but less so than the Koondahs at Sespara; and, I think, it is worthy of inquiry to ascertain whether here also may not be found a climate as bracing and welcome to the enervated constitution of the European invalid, as is found to exist on our better known hill-stations.

Three distinct tribes inhabit the Annamallay hills; they are denominated Kadars, Paliars and Muleers. The Kadars will perform no menial labor, as their name implies, they are the lords of the hills. They will carry a gun, and are expert at stalking game. But they are offended if called coolies. They are a truthful, trustworthy and obliging tribe, and exercise some influence over the Paliars and Muleers. Small in stature, their features resemble the African; and they have their curly-hair tied by a knot behind, and they file the four front teeth of the upper jaw to a point, as a marriage ceremony.

The Paliars are chiefly herdsmen and merchants, while the Muleers are cultivators of the soil. None of these tribes reside at a higher elevation than 4,000 to 5,000 feet above the sea.

All deal in the rich produce of these hills, and barter with the people in the plains their cardamums, turmeric, ginger, honey, wax, resins, millets, soap-nuts, gall-nuts, &c., for rice, tobacco, &c.

They are very expert in climbing trees and the precipitous face of rocks in search of honey. To accomplish the former, where there are no boughs, they drive short bamboo spikes into the tree and thus form a ladder, by means of which they ascend the highest forest trees; and they reach the latter by means of chains formed by rings made with rattan, which being secured to a point above, drop down the face of the rock; we observed some of these chains full 50 to 60 feet in length.

The upper ranges are in undisturbed possession of wild beasts. We saw a herd of bison; elk and ibex in numbers, and also tracts of wild elephants; the latter I encountered in the lower plateaux towards Toonooeuddoo.

SECTION V.

Galee Kondah or Purvatum.

In February 1859, His Excellency Sir Patrick Grant instructed a Committee of Military and Medical Officers, to ascend the hills to the SECTION V.

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north of Vizagapatam, with the view to explore an elevated locality, which was said to be suitable for a mountain sanitarium for the Northern Division of the Army. Having formed one of the party, I proceed to record the result of our inquiry.

Route to the foot of the ascent.

The party arrived at the village of Boondwarra by separate routes, namely, direct from Waltair and *viâ* Vizianagrum; the road from Waltair is very good as far as Singarcottah, thirty-four miles; from this place to the village of Boondwarra, four miles, there is barely any trace of a road; but the country is level, and the construction of a road practicable. The road from Vizianagrum is also tolerable.

The village of Boondwarra is 362 feet above the sea level; it is surrounded by hills, except to the east, varying in elevation from 300 to 600 feet above the plain. There are about twenty houses in the village; the inhabitants appear healthy; and the Committee were informed that fever does not prevail in this spot; the water is muddy and indifferent. Here at 6 A.M. the thermometer stood at 66°, at 9 P.M. 78°, and at 3 P.M. 92° in a small single fly hill-tent.

The village of Kassipoorum is four miles from the last, and contains upwards of 150 houses. Here supplies of all sorts are procurable; and there is a large weekly bazar.

Three miles further on is the village of Koottoor, which is placed at the foot of the ascent, and is situated 675 feet above the sea: there are a number of shady trees around it; and the road from Boondwarra is very good, except during the rains when the nullahs are full. The Committee were informed that fever is endemic both at Kassipoorum and Koottoor.

Ascent.

The path for the first two miles is indifferent; where it descends to, and skirts, the mountain streams, it becomes rugged and in parts steep, but loaded bullocks pass up and down almost daily. There is a halting spot at the small village of Tarra, where at 7 A.M. the thermometer stood at 62°, aneroid 28·530, which gives an approximate elevation of 1,375 feet above the sea.

At the position of the village of Dounkoo, about two miles from Tarra, are gardens, cultivated land, and abundance of good water. At 8 A.M. thermometer indicated 68°, aneroid 27·650, giving an elevation of about 2,200 feet.

A mile to the north of Dounkoo is the village of Royawalsah, well situated in the midst of cultivation; supplies are procurable on a moderate scale; there is excellent water and good encamping ground. In

descending, the Committee passed the night on the spot, and ascertained from the villagers, that during the rains, fever prevails to a considerable extent. At 6 A.M. thermometer stood at 55°, aneroid 27·000, giving an approximate elevation of 2,850 feet. The distance from Royawalsah to Koottoor is nearly five miles; the average ascent may be stated to be 1 in 11.

Two and a quarter miles further on is the village of Annuntagherry; the path at first passes through cultivation, then crosses a considerable stream, from whence it becomes broken and stony, winding round the western slopes of the hills, from whence there are some fine views. The village of Annuntagherry contains forty houses and about 250 inhabitants. Considerable extent of cultivation and small herds of cattle were seen around it. Fever is said to be rare. At 10 A.M., thermometer stood at 76°, aneroid 26·750, giving an approximate elevation of 3,111 feet.

The path which had hitherto taken a northerly course, now descended north-west to a fine stream running north and south, discharging about three cubic feet per second, and distant from Annuntagherry 2¾ miles. On the bed of the stream the aneroid stood at noon 25·850, thermometer 82° in the sun, the temperature of water was 63 degrees. From here the ascent is steady for one mile, and until within four hundred feet of the saddle of the Galee Purvatum, when it becomes very steep The ascent occupied six hours; the distance from the plain is about eleven miles, nearly the entire of which can be ridden.

Geological formation and vegetation.

The summits of these elevated ranges are chiefly masses of stratified granite (gneiss and sienite); the strata upheaved on their edges and irregularly weathered. The interstices have rich black mould, and the summits and slopes of others are covered with laterite, on which the bastard date flourishes; in the lower and more sheltered spots the wild raspberry, orange, sago palm, the tree fern, mango, cactus and tamarind trees are met with.

Galee Purvatum.

"The hill of wind" the highest portion of the range, marked in the map as unexplored territory, is in latitude 18°30' north, longitude 82°50' east, and distant in a direct line from the sea about forty-five miles. In form it has a double crescentic shape, and marks the boundary between the Zemindary of the Rajah of Vizianagrum to the south, and that of Paunchepunta to the north.

The saddle connecting the two crescents is the lowest part of the range, and is a terrace varying from 92 to 150 feet broad and 700 feet in length, the surface of which is irregular and broken.

On this spot the Committee encamped. At 3 P.M. the aneroid stood at 25·075, and thermometer at 76°, the boiling point of water at the same hour was 203°, which gives a mean altitude of 4,988 feet above the sea. The only water procurable for camp is in a shola between 400 and 500 feet down a steep descent.

The double horns of the crescent rise abruptly. On the highest point of the north-western horn, the aneroid at 8 A.M. indicated 24·775, thermometer 64°, the approximate altitude being 5,287 feet. On the summit of the south-western horn at 9 A.M. the aneroid stood at 24·700, and the thermometer at 60°, the approximate altitude being 5,345 feet. From the latter, the ground drops in undulating ridges for about a mile, facing the east, towards ravines and sholas, in some of which there are running streams. The lower part of this space is covered with rich soil and high grass, and it is open to the sea breeze. About the centre, at 10 A.M., the thermometer stood at 74°, aneroid 25·175, giving an approximatee levation of 4,838 feet. On this position there are some favorable spots for the erection of buildings on a limited scale, and at a moderate distance from water; but on the high ridges, the bare rocky surface, and distance from water, render the erection of buildings impracticable.

At the most elevated points on the north and south-eastern horn of the crescent, the indications of the aneroid were as follows: at 7 A.M. 24·950, at 7½ A.M. 24·860, and 8 A.M. 24·875; the thermometer at each period being 62°, which gives an approximate elevation of 5,100 feet; the surface of this space is smooth and capped with laterite; the breadth averages from 200 to 250 feet, and the length from 500 to 800 yards. The position overlooks every other place; and there is water in two sholas about the centre of the space, bearing north and south, with a descent of about 500 feet from the summit. *This is beyond question the most desirable position on the summit of these ranges*, and an easy approach to it could be found before descending to the stream mentioned above, as being one mile from Galee Purvatum. The Committee have named this spot "Grant's range."

In the Zemindary of Paunchepunta, Rajah Babiah, to the north-east and west of the Galee Purvatum, are extensive cultivated valleys in the midst of the hills, as far as the eye can survey; that to the north-west appears to be unbroken cultivation from twelve to fourteen miles long, by four or five broad.

A little to the west of north, and about a mile from the foot of the hill, is an elevated valley, which appears to the Committee well suited for the purpose of a sanitarium. It has a south-eastern aspect,

and a plentiful supply of water, with an admirable natural drainage, the surface soil being of a porous laterite. Towards the south and east, the valley is shut in by the lofty Galee Purvatum range; to the north, at a distance varying from two to ten miles, the hills are broken and attain a considerable elevation; while in the direction of the sea there is an open space, beyond which the hills are more distant and broken, and thus permit a free passage for the sea breeze along the entire extent of the valley.

Several elevated knolls admirably adapted for building sites rise up in this valley; the slopes of these knolls are cultivated, and on the lower grounds are some hamlets; the chief of these are Kanibally and Balagherry. The Rajah resides at the village of Paunchepunta or at Murguddy, in the large valley from whence there is an extensive traffic to the plains. During the residence of the Committee on these heights we observed large droves of cattle conveying grain to Kassipoorum. The inhabitants in this valley appear healthy and robust, and they stated that fever was hardly known amongst them.

The following were the indications of the thermometer and barometer in this valley.

At 7 A.M. aneroid 25·800, thermometer 58°; at 8 A.M. aneroid 25·775, thermometer 66°; at 9 A. M. aneroid 25·700, therm. 63°; which gives an average altitude above the sea of 4,300 feet; and taking into consideration that this spot is in latitude 7° north of Jackatalla, we may assume that as compared to the latter, there is a difference of 4 degrees mean temperature during the year, which is also the difference caused by an elevation of 1,000 feet, which would make this spot nearly equivalent to 5,300 feet.

The Committee have called this spot "Harris valley"; and they are of opinion that this locality also possesses the requisites for the formation of a sanitarium on an extended scale.

The Committee cannot speak too highly of the climate of Galee Purvatum during their residence on the heights. The wind blew steadily from the north from about midnight to mid-day, and during the remainder of the twenty-four hours, it set in direct from the sea. To the feelings the climate was most agreeable; the evenings became chilly, and the nights were so cold, that although the four members of the Committee slept in a small hill-tent, they were glad of the covering of two blanket each; and they all remarked that they were able to take an amount of exercise without fatigue that could not be borne in the low country.

The following table exhibits the thermometrical indications in camp during our stay on the heights, and contrasted therewith is shown the temperature taken at Vizianagrum and at Waltair at similar periods.

Month and date.	At Galee Purvatum.				At Vizianagrum.				At Waltair.				Remarks.
	6 A.M.	9 A.M.	3 P.M.	9 P.M.	6 A.M.	9 A.M.	3 P.M.	9 P.M.	6 A.M.	9 A.M.	3 P.M.	9 P.M.	
February	*	*	*	*									* Indications taken while ascending.
18th	65	65	67	60	77	78	85	82	76	85	82	79	
19th	62	70	72	59	76	79	85	81	76	83	82	78	
20th	58	69	76	64	76	76	87	81	74	82	84	79	
21st	61	66	74	65	74	76	87	82	73	82	84	78	
22nd	58	76†	80†	60†	73	77	86	81	73	83	82	79	† Indications taken while descending.
Mean...	60	69	73	62	75	77	86	$82\frac{2}{5}$	$74\frac{3}{5}$	83	$82\frac{4}{5}$	$78\frac{3}{5}$	

In the year 1854, the community of Waltair induced two European Pensioners to ascend these heights. The following is the Thermometrical Register kept by them from the 21st April to the 20th May, which gives a maximum of 88°, a minimum of 68°, and a mean of 78°. SERIES I. SECTION V.

1854 date.	6 A.M.	10 A.M.	12 mid-day.	5 P.M.	Remarks.
21	75	81	82	79	Very cold and heavy rain with half-gale of wind at afternoon.
22	75	78	83	85	Do. do. do.
23	76	81	85	88	Very high and hot winds.
24	78	81	85	86	Very hot sultry day.
25	79	82	86	85	Do. do.
26	80	85	85	79	A mild forenoon and heavy rain at afternoon.
27	77	81	86	79	Heavy cold rain at afternoon.
28	75	80	83	79	Heavy rains and passing clouds at afternoon.
29	77	80	84	77	Heavy rains with thunder and lightning, followed by heavy fog at noon.
30	73	80	83	75	Heavy rains at afternoon and cold.
May 1.	77	80	85	72	Heavy rains with hailstones at afternoon.
2	76	81	80	71	Very cold at afternoon, and heavy rains at night with much fog.
3	75	75	75	70	A mild day.
4	68	71	75	75	A heavy shower of rain at afternoon, followed with cold winds.
5	71	78	81	71	Do. do. do.
6	68	75	80	68	Heavy shower of rain at afternoon with thunder and lightning.
7	69	75	87	69	High wind, followed by a shower of rain at afternoon.
8	71	76	78	75	A mild day.
9	73	77	78	68	High wind, followed by heavy rain and thunder at afternoon.
10	71	78	81	76	A mild day.
11	71	78	81	76	Heavy wind with slight rain and thunder at afternoon.
12	70	78	82	75	A mild day.
13	71	78	83	76	Do.
14	75	80	84	78	Do.
15	76	82	84	78	Do.
16	75	78	81	71	Heavy rains with thunder and lightning at afternoon.
17	74	79	80	76	A mild day.
18	69	72	79	70	Heavy rain at afternoon.
19	74	76	79	73	A warm forenoon, followed with rain, thunder and lightning at afternoon.
20	72	79	81	75	A mild forenoon, followed up with heavy rains, thunder and lightning at afternoon.

SECTION VI.

RAMANDROOG HILL SANITARIUM.

The discovery of a really healthy hill-station within a moderate distance of our large military posts in the plains, occupied by Europeans, is assuredly a great desideratum. It is now twelve years since the solitary hill, which forms the subject of the present series of my reports, was first converted by the authorities into a site for a Convalescent Depôt, and in the words of Mr. Ranald Martin it has fully proved itself to be "one of those valuable islands in the plains which has sanitary excel-"lences peculiar to itself." Yet twenty-two years ago, when I first did duty at the station of Bellary, a deadly fever was supposed to be the certain result of a visit to the locality. Times are now changed and experience has taught us that the number and extent of our hill Convalescent Depôts may be increased with the utmost advantage to the health and efficiency of the Army.

Ramandroog is thirty-eight miles from Bellary, the head-quarters of the Ceded Districts. It is one of a broken series of hills, denominated the Sundoor range, encircling a rich well-watered valley of the same name. The entrance to this valley from Bellary is peculiarly picturesque. To the right and left an unbroken semi-circle of mountains approach each other; at a distance they appear to unite in the centre of the arc, and obstruct all passage forwards. As you approach nearer, two huge solitary rocks stand up in the plain like sentinels; and on passing these, the semi-circle of hills are seen cleft to their base, giving passage to a rapid mountain torrent. To the right of this narrow opening a huge mass of rock with scrubby jungle on the surface projects upwards almost perpendicularly 800 feet; and to the left, the stream has worn away the side of the hill, exposing in bold relief a perpendicular pyramidal wall of rock, bare from the base to the apex. This natural gap has been artificially strengthened and connected by a buttressed wall, having a strong gate-way in the centre, which gives passage to the rich Sundoor valley, now covered with luxuriant crops of wheat, jowarun, &c. Here and there the valley is broken by elevated ridges and finally terminates close to the native town of Hospett, about fourteen miles to the east of the barrier.

The road from the Sundoor gate winds through low jungle and is easy of ascent both for foot travellers and wheeled conveyances. The cleared platform on the summit is one and a quarter mile in length, but an equal extent now clothed in thick jungle, denominated Archer's plain, having the same elevation as the Droog is connected to it by a tongue of

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land which runs towards the west. The greatest elevation of the plateau is 3,400 feet above the sea, and 1,825 above Bellary. There is not much undulation on the surface, but the highest edge is towards the east and it slopes gradually to the west; the general elevation here being 150 feet lower than the eastern end. The slopes of the hill all round are covered with low jungle-wood and intersected with small sholas or wooded ravines. To the west and north, the Toombuddra river is seen in the distance meandering through the plains, and numerous tanks formed from springs which flow all the year round, irrigating the fields. Elk, jungle-sheep, Tiger and Cheta, and the usual tribe of jungle fowls, are found on the slopes of the hill.

Lake and Garden.

To the south of the plateau and to the right of the tongue, communicating with Archer's plain, the upper portion of the ridge on every side retires and forms a beautifully picturesque basin. At the bottom of which, 500 feet down the hill, is a small lake of pure water, formed by a number of small trickling springs, which appear all to discharge at this point; but if traced to their sources, might probably be found at a much higher level. Three sides of this basin are studded with forest trees and bamboos, resembling park scenery at home, and a rich profusion of wild flowers adds beauty to the landscape; while immediately around the borders of the lake there are several gardens, in which coffee, the graft-mangoe, peach and all vegetables, attain the greatest perfection; and heliotropes, verbenas, carnations and dahlias flourish in all their beauty. The most extensive and productive garden on these hills belongs to Colonel Archer, the Officer in Command of the Depôt, who, with excellent taste, has opened out the natural beauties of the hill, by forming paths around the sides, where, for the greater portion of the day, one may be protected from the rays of the sun. This garden is contiguous to the barracks, and is already a favourite place of resort for the convalescent soldiers, many of whom pass much of their time, and not unfrequently have their meals brought to them, there. This Officer anticipates an early return to England. There are many natives who are eager to take his garden off his hands; but he is desirous of securing it as a Soldier's garden, and he suggests that it be placed under the charge of a respectable European pensioner, who, with his family, might find permanent accommodation in the public quarters, now in course of erection. The soldiers would then be encouraged to work in the garden. One native mallee and a boy would be all the establishment required in addition to the pensioner. A source of recreation of this descrip-

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tion for the soldier is much wanted on the Droog, and I very strongly recommend the subject for favorable consideration. The hill of Ramandroog appears to have been in former times a fortified stronghold; the various approaches to it have still the remains of barricades and looped-holed parapets, with the ruins of walls at less accessible parts. Several walled excavations are still visible, probably intended as graneries, as grain has been found in some. There are also to be seen foundations of oblong buildings, usually eight in a clump, the ruins of the habitations of the people who resided on the summit. Five miles from Hospett, which forms the north-east boundary of the Sundoor valley, are the magnificent ruins of the ancient city of Bijanuggur; the history and downfall of which are veiled in obscurity. I have traced the walls of this city to the belt of hills which encircle the Sundoor valley, and have little doubt that Ramandroog in those days formed a fortified stronghold attached to the city, for the architectural style of the ruined walls are the same.

Water.

The rock of which the hill is formed is hornblende, peculiarly rich (75 per cent. it is stated) in pure iron. Some detached pieces affect the magnet. A disintegrated lateritious earth has accumulated on the surface from the decomposition of the hornblende, which, from its extreme porousness, readily absorbs all moisture; so that there is no water found until the underlying rock is reached, usually at a depth of 500 feet below the plateau. Here there is a plentiful perennial supply, and it is of excellent quality. Chalybeate springs are found in two localities; that chiefly used is in the basin above described. The analysis of this water made by the Professor of Chemistry at Madras, gives the following results:—

Chloride of Sodium......	22·38
Carbonate of Soda........	7·56
,, of Lime........	24·04
,, of Iron..............	6·38
Alumina..............	8·00
Silicic Acid..................................	12·46
Organic matters............................	19·19
	100·00

The specific gravity of the water is 0·9978. An imperial gallon contains 16¾ grains of insoluble salt, &c., and 5·97 gallons contain 100 grains in the above proportions with a trace of magnesia and potash. The amount of carbonic acid in this spring is very similar to that found in the carbonated chalybeate Cheltenham waters, there being less iron in this spring. Analysis has shown that the Ramandroog water contains no deleterious substance, neither does it contain alumina or lime in any quantities that may be injurious; the first being present a little more than a grain in a

gallon, while the latter in form of carbonate scarcely exceeds 4 grains in the gallon. The consideration of these facts renders it evident that the Ramandroog spring should be quite as beneficial as that of Cheltenham and other places, and invalids who are in the habit of partaking of it, assure me, that it excites the appetite, aids digestion and checks nausea and vomiting. I have carefully examined this spring and consider that it will be a highly advisable measure to guard it more care-fully than has hitherto been done. Measures should be adopted to receive the water as it flows direct from the side of the hill, and not, as is now the custom, after it has received vegetable impurities and imbibed oxygenfrom the atmosphere, depositing its salts as it undergoes decomposition along the channel which carries it away.

SERIES I. SECTION VI.

Temperature and rain-fall.

The average temperature of the Droog very much resembles that of Bangalore, but the climate is much more equable and the variation of the thermometer less. Throughout the year it is most agreeable to the feelings, very salubrious, and imparts elasticity and health to the constitution. From its solitary position, even in the hottest seasons, the air reaches it fresh, rarified by the elevation,—not obstructed by high walls, rocks or jungles, not heated by passing over a large extent of table-land, and not rendered impure by the absorption of emanations from town filth. During the months of March, April and May, when at Bellary the heat is constant and the thermometer ranging from 96° to 100° in the shade, it seldom exceeds 84° in the houses on the Droog. The mean temperature and fall of rain is exhibited in the following table.

Months.	Temperature.	Fall of rain.	Months.	Temperature.	Fall of rain.
October......	77°	14·17	April..........	79°	2·8
November.....	75°	...	May............	84°	2·8
December....	74°	·11	June...........	76°	·16
January......	74°	...	July...........	77°	16·10
February.....	88°	...	August........	74°	12·10
March.........	80°	·15	September ...	72°	4·16
	Mean temperature being 77·9.			Total...	55·11

Salubrity.

The mornings and evenings are always cool and delightful to the feelings, and all who have visited the hill agree in one sentiment; that even when the temperature of the thermometer rises higher than ordinary, no inconvenience is experienced. On the occasion of my visit to the hill, I found invalids there of the Royal Artillery and 1st Royals, who, nine months before, I had seen reduced to death's door from dysentery at Secunderabad, without, I then conceived, much prospect of recovery. But now,—what a marvellous change,—they assured me that with the

SERIES I. SECTION VI.

exhilirated spirits which followed on their transfer to the highly rarified and bracing mountain-air, and the exercise which they were induced to take, their wasting disease gradually disappeared, their appetite returned, they "became quite light-hearted on feeling that they would not die, and are now nearly as stout as ever." The climate is well adapted for all who are free from structural disease of the large organs, whose health is declining either from climatic influence or from threatened alterations of structure.

The following table exhibits the ratio of recoveries amongst the invalids who have resided on the Droog from the foundation of the sanitarium in 1848, till the date of my inspection on the 18th October 1859.

Recovered and discharged to duty.......	170·26
Partial benefit, invalided Home........	55·
Died..	5·74
Average daily sick under treatment......	11·75

and of the remaining, the majority are doing well. During the twelve months prior to my official visit to the Droog, Detachments from the following Corps have visited the sanitarium.

Royal Artillery.
Her Majesty's 12th Lancers.
Her Majesty's 1st Battalion 1st Royals.
Her Majesty's 74th Highlanders.
Her Majesty's 3rd Battalion 60th Rifles.
Her Majesty's Indian Artillery.

That the selections have been judicious, is proved by the small mortality which has taken place amongst the convalescents. Those who applied for relief at the hospital during the past twelve months, are as follows :—

Diseases.															
Fevers.		Lungs.		Liver.		Stomach and bowels.		Brain.		Rheumatism.		Venereal.		Other diseases.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
10	...	10	...	19	...	78	...	4	...	14	...	5	...	25	...

Cholera.

Cholera, the fatal scourge of the Ceded Districts, has never yet been known to originate on the Droog. Cases of this disease have occurred in natives, but in every instance they have been traced from the villages below, and it has not spread. There are occasional cases of catarrhal fever; but the remittent form is unknown in these hills. Doubtless the advantage of the climate of the Droog to invalids is in a great measure owing to its unvarying and equable temperature, whereby the natural action of the skin and kidneys are neither excited or checked, and thus congestions of the large organs are avoided.

Barracks.

The present barracks on the hill are calculated to accommodate eighty convalescents, and the hospital twenty sick. These buildings were erected as an experimental measure and are deficient in many things; such as glass doors and windows, and verandahs to the barracks, coffee-room and library, guard and store rooms, and properly adapted lavatories, cook-rooms, privies, &c. The buildings for convalescents are about to be extended to accommodate 200 men, with a proportionate increase to the hospital accommodation. Quarters for married men are in course of construction. Barracks should be erected to accommodate two Companies of effective Europeans of the Garrison at Bellary, instead of extending the accommodation for them at that station, so as to secure a healthful interchange from the plains for a few months at a time.

Bazar.

A large bazar has sprung up in the neighbourhood of the barracks, erected without any regard to sanitary considerations; it has now become a perfect nuisance, for the outskirts around are promiscuously defiled with human ordure and other offal, objectionable as regards the salubrity of the station and disgusting to those who are forced to frequent the locality. Immediate steps should be taken to remove this bazar from the summit of the plateau to the eastern aspect of the basin before mentioned. There is plenty of space on the slope here for double the number of houses now on the summit. Water is close at hand; and there are suitable places for the erection of public latrines when the ordure would be at once carried down to the plains by means of a stream of water. If this measure be carried out, the present site of the bazar would then be available for the erection of barracks, in fact it is the best spot on the hill for this purpose.

It is of the utmost importance that absolute authority be exercised in maintaining a rigid system of conservancy throughout the plateau, upon the hill sides and in the ravines, for it may be taken as an established fact that neglected conservancy will in these elevated regions

SERIES I. SECTION VI.

lead to typhoid fever and bowel disorders. To secure this important measure, the Ramandroog, which is now the property of the Zemindar of Sundoor, should, if possible, become Government property, and the sole control over it should be vested in military authority. As the Rajah of Sundoor objects to bullocks being slaughtered on the hill, all the beef consumed by the men comes from Hospett, twelve miles off. It is often so bad when it arrives, that it is condemned, and the men are thus at times hard pressed for food.

Importance of employment and recreation.

We have the high authority of Dr. Robert Jackson for asserting, that Europeans enjoy better health under active employment, under a tropical sun, than when their time is passed in indolence and ease in barracks. Planters, he states, are healthy and vigorous under active daily employment. Soldiers are healthy and vigorous under active military service; but the cessation of labour or the return to rest in either, is, he adds, almost uniformly followed by the explosion of disease. Our experience in this country will, I think, confirm these views of Dr. Jackson. The death-rate in our Engineer Corps and in the Public Works Department is less than in any other branch of the public service, and they are constantly exposed to the sun.

It is essential therefore that our soldiers, especially on these mountain ranges, should be furnished with every available means of exercise and recreation in the open air, as gardening, quoits, cricket, skittles and gymnastics, &c., and exercise also within doors in wet weather, such as facilities for practising their trades, theatres, &c. In Minutes of Revenue Consultation of 28th July 1857, No. 27, it is stated, "With the sanction of Government a small Library will also be sup-" plied for the use of the men at the Depôt as early as possible." Colonel Archer informed me that the only books the men have are received from Bellary. In extending the hospital accommodation, an apartment might be allotted for the Medical subordinate; the present Assistant Apothecary's quarters would then form a good library and office.

Cookroom.

It appears to me that the cook-rooms and privies, now in course of erection contiguous to the married men's quarters, are being constructed on a most objectionable plan. In the former the only egress for the smoke is by the door, and by a window close to it on the same side. Both this apartment and the privy should be provided with the means for securing egress for air above, as well as ingress for it below.

Cemetery.

The grave-yard for the station is placed on the summit of the plateau about 150 yards from the married men's quarters. The surface

is chiefly rock, so that it was necessary to blast with powder before the last grave was dug to a sufficient depth. In consequence of its close proximity to these quarters, it becomes necessary to limit the space of ground, which should otherwise have been allotted to each house; and independent of this, from its proximity to the barracks, the position is highly objectionable. A very excellent place for it would be a retired level spot to the right of the present site, a little way down the hill, which was selected by Colonel Archer and myself; and to this place, I beg to recommend that the three soldiers' graves which, I believe, alone occupy the present enclosure (which has not yet been consecrated) be removed. Space is so valuable on the confined summit of this hill, that nothing should be admitted there, which would in any degree risk the hygiene of the spot. This enclosure would answer well for a play-ground for children, and as a bleaching field for the soldiers' wives. SERIES I. SECTION VI.

SECTION VII.

Moothoor Hill.

This hill forms one of the Puchmurree chain, considered the most eligible from its central position and its elevation, for convalescents from Nagpore and the surrounding Military and Civil stations in Central India. SECTION VII.

It is distant from the extensive Military Cantonment of Kamptee	105	miles.
The Civil station of Chindwarra	35	"
The Civil and Military station of Baitool.	60	"
From Jubbulpore	40	"
From Aurungabad	40	"
From Nursingapore	80	"
From Saugor, a large Civil and Military post,	130	"

The Reverend S. Hislop, who was the first to draw attention to this range of mountains, describes the spot as an excellent site. The plateau is 1½ to ¾ of a mile wide, and consists of a table-land of trap resting upon sandstone. There is a cart road from Kamptee as far as Jamwye, a considerable village with a Government native official, and weekly bazar, about 1½ miles from its escarpment. This road could easily be prolonged up the ghaut to any village on the summit that might be selected; ordinary supplies can easily be procured in the villages, and especially at the weekly bazar just mentioned.

SERIES I.
SECTION VII.

The plateau immediately about Moothoor is tolerably level; here and there are a few hillocks and ravines; the tops of the former are crowned with low jungle, which also lines the sides of the latter. In one of these ravines, the Pench river takes its rise.

The northern face of the range is about a mile from Moothoor; the sides of the hills are clothed with a dense jungle; and from the edge the view embraces a number of smaller ranges covered with a mass of jungle, stretching between the Moothoor range; the Mahadewa clump, lies directly opposite at a distance of about six or seven miles, and appears to rise out of the valley, like a pile of buildings.

The whole scenery from this point is very fine. To the eastward from Moothoor towards Doosawanee, following the northern verge of the hills, many spots may be found of greater eligibility than that in the neighbourhood of Moothoor.

In August 1860, the hottest period of the year at Kamptee, a Committee of Military and Medical Officers proceeded from Kamptee to explore Moothoor, and after a residence there of twenty-two days, reported most favorably of the position. They found it "cool and fresh in the morning—moderately warm in the day—pleasant in the evening—and cool at night—with a cool breeze from the west, such as would conduce to the sleep of an invalid.

"The maximum temperature in a wattle and daub hut having a thatched verandah, was at one time 97°, the minimum indication was 71°, the mean from sun-rise to sun-set, 87°, and from sun-set to sun-rise 78½°. The average daily temperature was under 83°. The maximum range in twenty-four hours indicated 22°, the minimum 11½°, and the mean of all the period 16°.

"The maximum temperature at Kamptee during the same period was 114½°, and the mean in excess of that of Moothoor was 11½°.

"The Ghound inhabitants of these hills occupy scattered villages, in huts constructed from bamboo-matting and thatch. In appearance they are under the average development; but present no appearance of splenic enlargement or other evidences of an existing endemic fever. They state that dense fogs prevail during the monsoon and white frost occasionally in the cold season. The only objection to the sanitarium site is that it is in the track of a large body of pilgrims, who annually resort to the Maha-deo Cave, a place held in great veneration by Hindoo inhabitants from distant parts.

"There can be little doubt that the climate of the Moothoor Hills during the hot season would be highly beneficial to weakly European soldiers

who have suffered from repeated attacks of fever in the low country, and others suffering from debility from the extreme heat there. Serious inconvenience and outlay is now annually experienced in sending this class of men to the Coromandel Coast, distant 700 to 800 miles.

Moothoor, in the opinion of the Committee, would bear favorable comparison with Ramandroog, it being about the same height above the level of the sea; and the latter has been found one of the most useful sanitaria for invalids generally in all India.

The site chosen for a sanitarium is described by them as lying between the 22nd and 23rd degrees of north latitude, with a general elevation of 3,400 feet above the level of the sea, the highest part of the range, rising from 80 to 120 feet above its lowest position. Surface drainage is complete and rapid, there being no marsh ground or dense jungle in the vicinity. The altitude of Chindwarra station, thirty miles from this spot in the plains, is 2,061 feet, or about 800 above Kamptee.

A sketch of the locality and the country adjoining has been prepared by the Reverend S. Hislop.—*See plate annexed.*

SERIES I. SECTIONS VIII, IX & X.

SECTION VIII.

CHICULDAH.

Chiculdah on the Vindhia, or as some call it the Gavulghur range of hills, is in latitude 21° north, and longitude 77° east, and about 3,600 feet above the level of the sea. The average mean of the thermometer for eight months, from November to June, is under 71°. The hottest months, April and May, give a mean of 83,° and the coldest months, January and February, give a mean of 59°.

It has long been a favored spot for ladies and children, and for invalid officers serving in His Highness the Nizam's country, many of whom can bear testimony to the benefit they have derived from a sojourn there. The varied and extensive scenery and the bracing air which prevails during the hot season, exhilarate the mind and bring immediate relief to the lassitude induced by the suffocating heat usual in the Deccan at this period. The hottest day ever observed, the thermometer rose to 96°; the coldest, it sunk to 47°; the greatest diurnal range was 22°, the least 4°; and the annual fall of rain averages from 45 to 55 inches. Potatoes and other European vegetables thrive well on the summit of these hills.

SECTION IX.

BOOLDANA.

Booldana on the range of table-land extending from Luckenwarra to Adjuntah. This table-land forms the southern wall of the valley, and you look down to the plain beneath from an ascent of 800 to 1,000 feet. The atmosphere on high regions thus situated is more free from unhealthy influences, and there is a greater difference in the climate, than can be acounted for by the mere difference in altitude. Moreover, the medical statistics of Booldana itself, for the twenty years during which, our knowledge of it extends (for the hill which passes by that name, has long been a resort for Europeans from Jaulnah and Aurungabad) is favorable to its salubrity.

SECTION X.

CALAGOUK, OR CURLEW ISLAND, IN THE BAY OF BENGAL, AS A MARINE SANITARIUM.

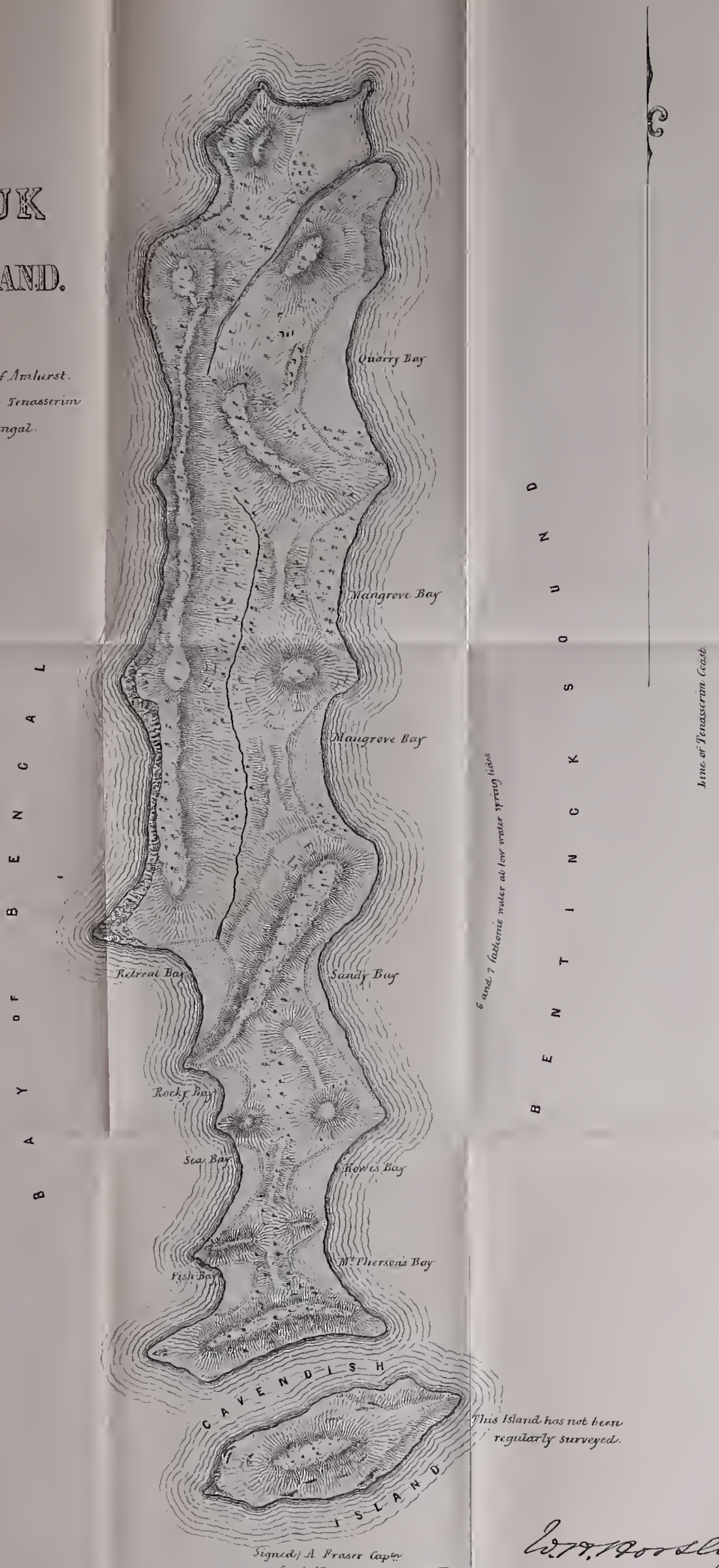
In the course of my inspections of the several stations of the Army during the past three and a half years, I have submitted to

CALLAGOUK
OR
CURLEW ISLAND.

An Island about 30 miles south of Amherst. 5 miles from the mainland of the Tenasserim Coast. Open on the west to Bay of Bengal.

Long. 97° 42′

Lat. 15° 52′.



Elevation of Western Ridge about 300 feet

J. Dumphy, Supt. & Mangr. Govt. Lithc. Press, D.P.W.

Signed / A. Fraser Captn. Supt. Alguada Reef Light House

W. W. Horsley, Lieut. Colo. Chief Engineer.

Drawn by [illegible] and Lithd. by J. Dumphy. [illegible] 1862

SERIE
Secti
VIII, IX

Government my views of the beneficial effects to the European constitution in health and in convalescence from disease, of a residence on elevated mountain ranges, as a prophylactic remedy under peculiar states of the system. I pointed out during the progress of my tour, how peculiarly favored the Presidency of Madras is, in possessing elevated ranges contiguous to her chief Military posts, and I selected certain places on the Coast as the most eligible which came under my notice, as places of resort for invalids whose health would appear to derive benefit by a residence there.

There are however certain disadvantages in all sea coast localities situated on the main-land and possessing no elevation,—such as the absence of sea breeze and the deleterious effects of land wind passing over miasmatic or extensive tracts of low arid plains at certain seasons, which an island of moderate dimensions is comparatively free from when placed in the midst of the ocean and possessing bays, sandy beaches, and an undulating surface with a good water supply and capabilities for drainage.

The subject of sanitaria for European troops stationed within the tropics has engaged my special attention for many years; but hitherto I have in vain searched for a locality such as I have now adverted to. There is no place answering the description contiguous to the vast line of coast between Bombay and Calcutta and in the Straits of Malacca; although the Island of Penang certainly possesses very many advantages; it has its disadvantages also. It has no protected sandy bays; and the lowland is so little above the level of the sea, that it is incapable of efficient drainage. Hence the hill, which is upwards of 2,000 feet high, is the only place of resort for invalids, and it is surrounded by such an extent of forest and lowland, that it cannot, strictly speaking, be viewed as a sea coast sanitarium. It is moreover too distant from our possessions in India to make it a place of general usefulness.

During my inspection of the Pegue Province, I learned that European invalids of all classes when they require a change are sent to the Coast, and thence transported to Madras at a great cost to the State in money and in loss of service, and no place in India can be worse adapted for sick men than the Depôt at Poonamallee, to which these invalids are sent, (*vide* my report on that locality). There are insuperable obstacles to the establishment of mountain sanitaria within, or contiguous to the British possessions in Burmah. Such desirable localities being situated in inaccessible positions, both as regards difficulty of communication and

SERIES I. SECTION X.

distance from stations; insalubrity of intervening country; want of population and supplies, en-route. Our existing well-tried sanitaria in India, therefore, ought to be the sole place of resort for European invalids, whose constitutions benefit by a residence on elevated localities; and to this end, as regards the Pegue Province, the object of Government should be to improve the communication from the frontier stations to the sea, and to establish a sea coast sanitarium in a convenient position for such as are likely to benefit by a residence there.

The wonderfully remarkable sanitary condition of all European residents in the interior and on the sea coast of Burmah, the extent of that Coast and the group of islands which stud its shores from Amherst to the Mergui Archipelago, naturally drew my inquiries in that direction. These brought me into communication with Captain A. Fraser of the Royal Engineers, Superintendent of Alguada Reef Light House, now under construction, an Officer fully acquainted with the sea-board of Burmah. Duty necessitating Captain Fraser to proceed in the direction of Mergui, he very obligingly agreed to afford me an opportunity of personally inspecting the line of coast and islands contiguous; and on my solicitation he cheerfully acceded to co-operate with me in the important field of inquiry which engaged me; thus aiding me with much valuable practical experience in his professional capacity, acquired in a career of twenty years, in selecting and laying out sites for the Cantonment of troops and the construction of barracks.

Amherst was the first place we visited, and in the absence of an island sanitarium, there is no doubt that it presents the most eligible site on the Coast. In form, it is a promontory of land washed on one side by the sea and on the other by the Moulmein river as it disembogues into the sea. It is well elevated and possesses an open porous subsoil beneath a clayey superstratum; but it has the disadvantage of dense jungle and swampy ground to the ——— , and muddy water in the river and sea sides. Yet with judicious clearing and draining, Amherst would doubtless become a very desirable Coast locality for invalids.

Calagouk, or Curlew Island,

The *Moscas*, contiguous to the mouth of Tavoy river,

Tavoy Island, half way between Tavoy and Mergui, and

King's Island, opposite Mergui, came respectively under our inquiries. Of these, the first, which occupies the subject of this report, is that in every respect the most suitable for a sanitarium.

Curlew Island, the head-quarters of the Alguada Reef Light House establishment, is situated in the Gulf of Martaban, five miles from the

main-land of the Tenasserim Coast, and thirty miles south of Amherst Point, in lat. 15° 52′, and in long. 97° 42′. It is eight miles long, exclusive of Cavendish Island, which lies at its extreme south end, and which is half a mile in length. The greatest breadth of the island is about 1¼ miles; and on its highest part, which is 500 feet above the sea, are "the remarkable trees," a point for navigators in making the Coast.

The base of the island is primary rock, the superstratum being a rich mixture of open porous soil composed of sand and vegetable mould. Its formation is very peculiar the northern and southern portions differing considerably. The northern half on the western side is composed of a long granite ridge, with an average perpendicular drop to the sea varying from 200 to 300 feet. To the east the ground descends to the sea in gentle or abrupt slopes. The opposite side of the island is broken into alternate or isolated hills, with level well raised intervening spaces forming three bays; the first "Quarry bay," where the stones are now being prepared for the Alguada Light House, is the deepest. At high water the beach is sandy, but at ebb-tide an extensive mud flat covered in places with mangrove is exposed; the somewhat narrowness of the channel between the island and the main-land on this side tends to the accumulation of mud.

The southern half of the island differs entirely from the northern, inasmuch as both sides are broken into bays. To the west, Retreat bay, Rocky bay, Sea bay and Fish bay, are beautiful hard sandy beaches, well protected by high land on each side, and open to the ocean with a fine rolling surf on the beach, and only divided from one another by projecting rocky points, and from the corresponding bays on the eastern side, by well raised necks of land, sloping east and west, free from all swampy ground, and ascending north and south to the hills which divide the bays. The eastern bays look beyond the Gulf of Martaban, to the distant main-land rising in bold outline on the horizon. These very much resemble the western bays, in fact differ only by the mud uncovering at half tides; the rise and fall at spring tides being 22 feet. All the bays on the eastern side are perfectly protected from the south-west monsoon; while during the north-east monsoon the bays on the western side and the deep water close up to the ridge on the north, afford a free, open, and safe place for yachting and boating. The bays on both sides are peculiarly well suited for bathing; the water on the western side especially being always pure and clear.

Ascending from Retreat bay, the ridge referred to in para. 9 is reached. This ridge, and indeed the entire island, is clothed with fine primeval

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forest, with trees of immense dimensions and height; under their overshadowing branches a well shaded road might with ease be carried along the ridge; the open ocean on one hand, with a view of the fine contour of the island itself, and the bold Coast of the Tenasserim Provinces in the distance beyond on the other. Here and there this ridge opens out into plateaux forming beautiful sites for houses, and with the exception of a slight rise about the centre, the road would nearly run on an uniform level for a distance of five miles. The same road might then be extended to the southward, encircling the bays and crossing the intervening points of land, and also to the northern part of the island where there is a considerable space of garden and cultivable ground. The free percolation of air by means of these roads, judicious clearings for building sites and the adoption of measures to facilitate the natural drainage, two or three years prior to the occupation of the island for sanitary purposes, are measures of the highest urgency and importance.

The island has now been occupied by a large party of workmen since April 1860. Usually the pioneers or first settlers in every locality, suffer considerably, especially when no prior arrangements have been made to guard against disease. In the present case a large body of natives of India, Burmah and China, European Officers and Subordinates, entered on operations of a harassing nature at the hottest season of the year. Quarry bay where they settled, is, sanitarily considered, by no means the best locality to settle on. But the presence of good stone and the facilities for shipping these to the Reef, induced the Superintendent to to fix his head-quarters here. I append a return of the strength of the establishment, the prevailing diseases, and the mortality from the 30th April 1860 to the 30th April 1861, from which it will be observed, that every thing considered, the sick and death-rate have been unusually small. It must be borne in mind that the party for many months had little or no protection by night or by day, and that their huts occupied unwholesome site in the midst of felled jungle. Yet the report presents a gratifying immunity from the graver diseases. The fevers were chiefly of an ephemeral nature; the sick list being kept up by local injuries and their results diseases not contracted on the island, and cutaneous affections from the want of anti-scorbutic articles of diet.

Daily average per cent. of prevailing diseases, from 30th April 1860 to 30th April 1861.

	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	Averages.
Strength..........	212	209	295	367	400	433	495	502	480	480	705	710	440
Dysentery...	·09	2·07	..	..	..	..	·10	·36	..	·11	..	..	0·23
Ulcers............	·07	5·1	3·1	4·1	5·5	3·8	2·6	3·5	4·1	2·1	2·08	3·64	3·38
Fevers...........	·08	1·0	0·9	1·0	1·2	1·5	3·4	4·9	4·1	4·1	2·3	1·55	2·17
Other Diseases.....	5·05	8·61	6·13	6·14	7·05	8·01	4·25	8·99	8·30	16·74	11·99	22·22	6·13

There were nine deaths during the year from diseases contracted on the island; three from dysentery in January; three from fever, from exposure; one in July, one in November, and one in January. Three from accidents and other diseases. No deaths occurred amongst the Europeans.

During my residence on the island in the month of May and June, the climate was exceedingly agreeable. The nights were cool, and no punkahs were necessary during the day. In fact, a refreshing sea breeze was present at all times in every part of the island visited by me during the day, and a blanket was always grateful at night. The average thermometer at this period during the day was 75°, during the hot weather it is 88°; and Captain Fraser speaks in glowing terms of the climate at all seasons, as compared with that in Calcutta. Water of an excellent quality is procurable at a depth of fifteen feet; and a perennial spring of sweet water flows through the centre of the island. The rain-fall is under that experienced on the main-land opposite.

One great advantage of this island is its proximity to Madras and Calcutta, and to the principal stations in Burmah. The large town of

Yay is on the opposite main-land, from whence small boats with supplies are constantly arriving; and as it is on the direct line of communication between Calcutta and the ports of Tavoy and Mergui, with properly arranged communications, there need be no difficulty in furnishing it with supplies. China junks bring fruits and other articles to the island; and fish of an excellent quality is procurable at all the bays.

Besides affording many beautiful localities for private houses, abundant space is available for 1,000 men, on eligible sites. But the planning and laying out of the island, so as to turn it to the best advantage, must be placed in the hands of a person well acquainted with its capabilities and who has an interest in the work. Captain Fraser's other duties constrain him to reside on the island for many months of the year. We have gone together all over it, and by his report, which accompanies this, it will be observed how fully he concurs with me on its capabilities, and that with the sanction of Government he is willing to undertake the superintendence of the preparatory improvements above recommended. No one is better qualified to undertake this important duty than Captain Fraser; for, in addition to his practical knowledge as an Engineer, he takes a deep interest in the improvement of the place, with the view to its future occupation as a marine sanitarium. I beg therefore to recommend that Government avail themselves of the opportune residence of this able Officer on the spot, and place a grant of money at his disposal, with full power to expend it to the best of his judgment. Mr. Cromarty, the Surgeon in charge, an able and observant medical man proffers his assistance in keeping careful meteorological observations, or in any other way that Captain Fraser may employ him.

As I have already observed, no place came under my observation within these tropics during a long period of close inquiry, possessing the numerous advantages for a "watering place" or sea coast sanitarium which this island presents. The equability of its climate, its protected sandy bays and beaches, and its pure sea-water, with the whole expanse of the gulf in front, make it a peculiarly desirable locality for bathing purposes. The numerous means of recreation that always present themselves on the sea shore, its excellent water supply, well raised surface, eligible sites for buildings, and the fertility of its soil, its moderate dimensions, whereby the entire island can with ease be kept under satisfactory hygienic control, and the facility of its approach at all seasons, and above all, its already proved excellent qualities as a sanitarium under many disadvantages, mark it as a most promising locality, especially where

structural disease is threatened, and demand that Government take an interest in its development. In conclusion, I may state that no case of sickness or death has occurred amongst a large number of women and children, families of the working residents, since the first occupation of the Island.

An eye-sketch of the Island accompanies this report.

OFFICE OF INSPECTOR GENERAL OF HOSPITALS,
GULPH OF MARTABAN,
CURLEW ISLAND, 24*th June* 1861.

From Captain ALEXANDER FRASER, *Royal Engineers, Superintendent of the erection of the Alguada Reef Light House, to Dr.* DUNCAN MACPHERSON, *Inspector General of Hospitals, Madras Army,*

CURLEW ISLAND, 24*th June* 1861.

SIR,

I have the honor to acknowledge the receipt of your letter No. 32, dated 27th May 1861, in which you requested a passage in the steamer *Setang* to Tavoy and Mergui, and desired my co-operation in the prosecution of your inquiries as to a fit position for the establishment on this coast of a sanitarium for the European invalid soldier.

2. My duties calling me to Tavoy, enabled me to do as you wished, and it has given me very great pleasure to afford you such information as my experience on this coast enabled me to give. I have since read your report, received with your letter No. 35 of this date, as regards Calagouk or Curlew Island; and I go with you in every word you have said on its capabilities, for the end you have in view, and am of opinion that it is superior in position, in accessibility, in climate, in its moderate and therefore controllable size, and in the great variety of hill and dale, sandy beaches and perpendicular cliffs, to any place that I know on this coast for the purpose of forming a delightful and healthy residence for the European.

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3. On the 1st September 1860, I had the honor of addressing the Secretary to the Government of India in the Public Works Department on this very subject, and I submitted to you a copy of the paragraph of my letter which specially referred to it. The Government passed no Order on that part of my letter, probably because it only formed a part of my regular half-yearly report, and the matter was not brought specially to their notice, and I have not since adverted to it, partly because the sickness of my work people after the last rains, was rather more than I had expected, and partly because I felt that my remarks on such a subject would carry with them little weight, were they not supported by eminent Medical authority.

4. When you proposed to accompany me in my trip to Tavoy, I felt that I should have an opportunity of showing you the capabilities of this Island, which I knew, from my own practical experience, were very great; and of securing, if I was right in my own judgment, that opinion which was necessary to cause the Government to appreciate the value of the Island as a sea-coast sanitarium. My only doubt was as regards Tavoy Island which, I thought, might be more suitable. I had never visited it, but had heard good accounts of it, and as one of my lighters had to go to Mergui, I was glad to tow her down there, visiting with you that Island en-route. I quite agree, however, with you that it is in no way equal to this Island for the purpose you have in view.

5. You have explored this Island in a more complete way than I myself have even had time to do before. You have carefully examined into the cases of sickness which have occurred in the hospital, and I am very glad to see that you come to the conclusion that such disease as we have had, does not proceed from the unhealthiness of the Island, but from the nature of the work and the peculiarity of our position. All places are more or less unhealthy according to my experience in Burmah, on their first clearance, and, I have been obliged, to a great extent, to place my people with reference to the work they had to do, rather than to their sanitary condition. Had I had more time, I might have placed them better, but the one work I have now in hand, is so far advanced that it would be a pity to move if it can be avoided, and with the advice I have received from you I have no doubt that next year we shall not suffer so much, even from the light disease which troubled us last season. The state of the hospital at this very time could not be more satisfactory.

6. Those who come here and go no further than the small space on which my settlement is placed, know nothing of the beauties or capabilities of Calagouk, and those who only look at the number of sick without going into the causes thereof, or making themselves acquainted with the constant exposure of all hands both at the Reef and at this Island, are apt to think the situation unhealthy; but, both the fever and the ulcer, the chief diseases from which we have suffered, may be traced to the nature of the work. Men came down here without any better clothing than they are accustomed to, and the constant cool wind which blows here, gives them cold and slight fever and ague, while the constant working among sharp stones causes bruises and abrasions of the skin which, without a good vegetable diet are apt to turn to ulcers. You are aware that the difficulty about vegetables can be overcome, for I know no place which affords such facilities for gardening, when the ground has been cleared. There would be no fever either, were sufficient time allowed for the malaria, consequent on the clearance to pass away before men were located here.

7. If the Government saw fit on your report to adopt this as a sea coast sanitarium, I do not see that much cash expenditure need be gone to. I should be most happy to take general charge of the work, and if I were allowed another assistant, a smart young Infantry Officer who has passed for the Department, I could well work the thing out according to your views with two hundred convicts (who could be kept separate from my own work people to the south of the Island) from Moulmein. These I have no doubt, Lieut.-Col. A. Fytche, the Commissioner of the Tenasserim and Martaban Provinces, would willingly consent to give, as it would tend so greatly to the general improvement of the Provinces under his control; but in my opinion, no large bodies of troops should be located here till the third year after the clearance of the jungle, though it will be doubtless possible to erect private bungalows at a much earlier date.

8. I have already done a little towards opening up the Island, the quantity of wood required for my steamer, enables me to do so. I shall be truly happy if the Government allow me to do more, as I shall feel that I shall be doing that which will prove a lasting benefit to the European community and soldiery of India.

9. So accessible is Calagouk, that were it properly laid out and well known, I feel sure its pure air and the sea-bathing, combined

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with the beautiful scenery would induce all, whether from Calcutta or Madras, or the chief towns and stations of Burmah, to make it their resort for the renovation of health, whether of mind or body.

10. In conclusion, I beg to thank you most sincerely for the trouble you have taken and the advice you have given for the improvement of the sanitary condition of our present settlement, and I have no doubt that by carrying out the measures you have suggested as far as our means will allow, we shall reap the benefit thereof by improved health next year.

I have the honor, &c.,

(Signed) A. FRASER, Captain,

Superintendent Alquada

Reef Light House.

SECTION XI.

Port Blair, Andamans.

TOPOGRAPHICAL SKETCH OF ANDAMAN AND BARREN ISLANDS.

Sanitary state of the Penal Colony of Port Blair, and its probable applicability hereafter for a Marine Sanitarium.

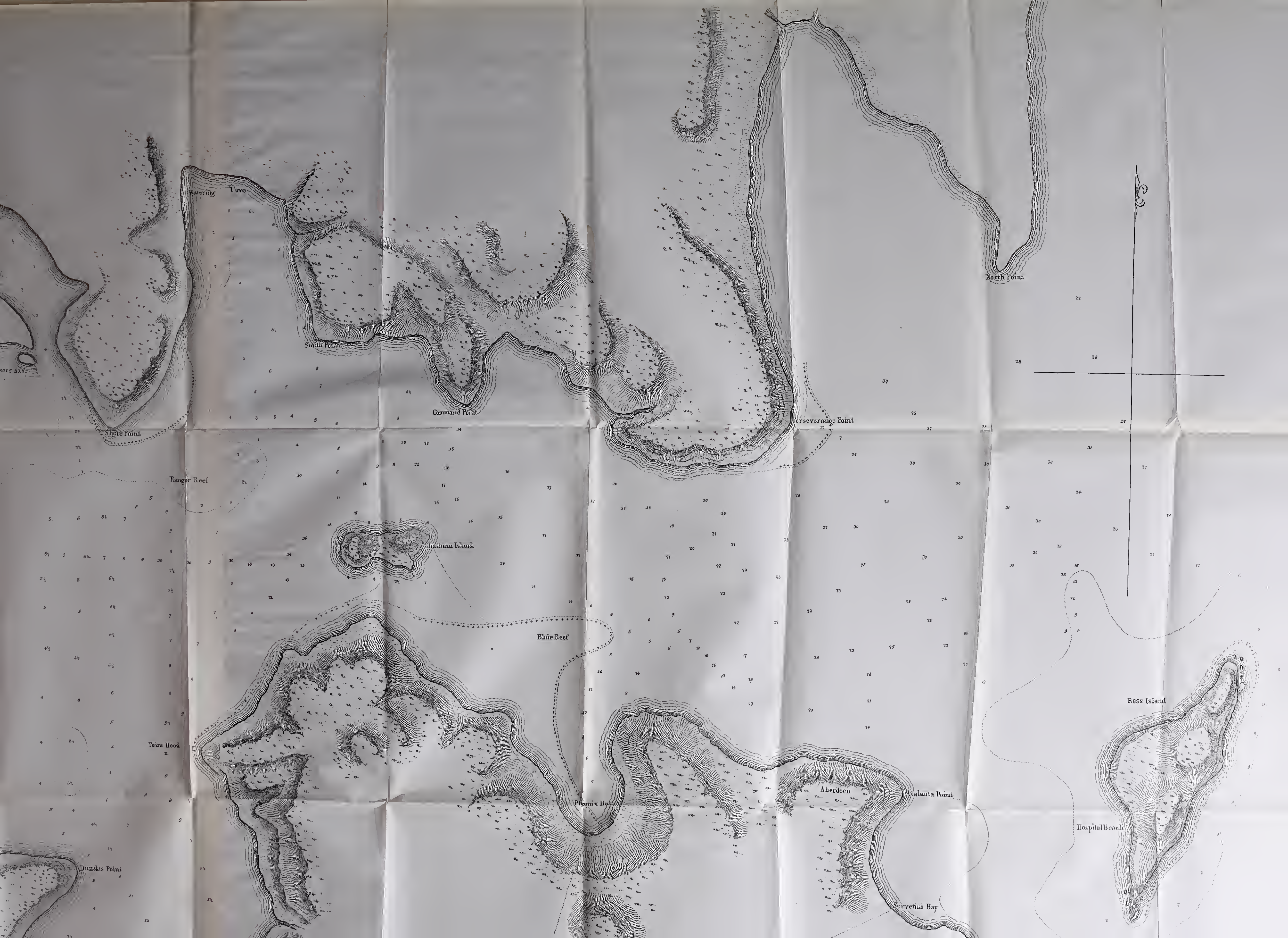
By Inspector General Dr. MACPHERSON, Honorary Physician to the Queen.

Preamble.—On the receipt of my report, proposing Curlew Island in the gulph of Martaban as a suitable locality for the establishment of a marine sanitarium and watering place for European invalids from the mainland of India, the Principal Inspector General in a despatch, as per margin, observes, " A sea-side place of resort

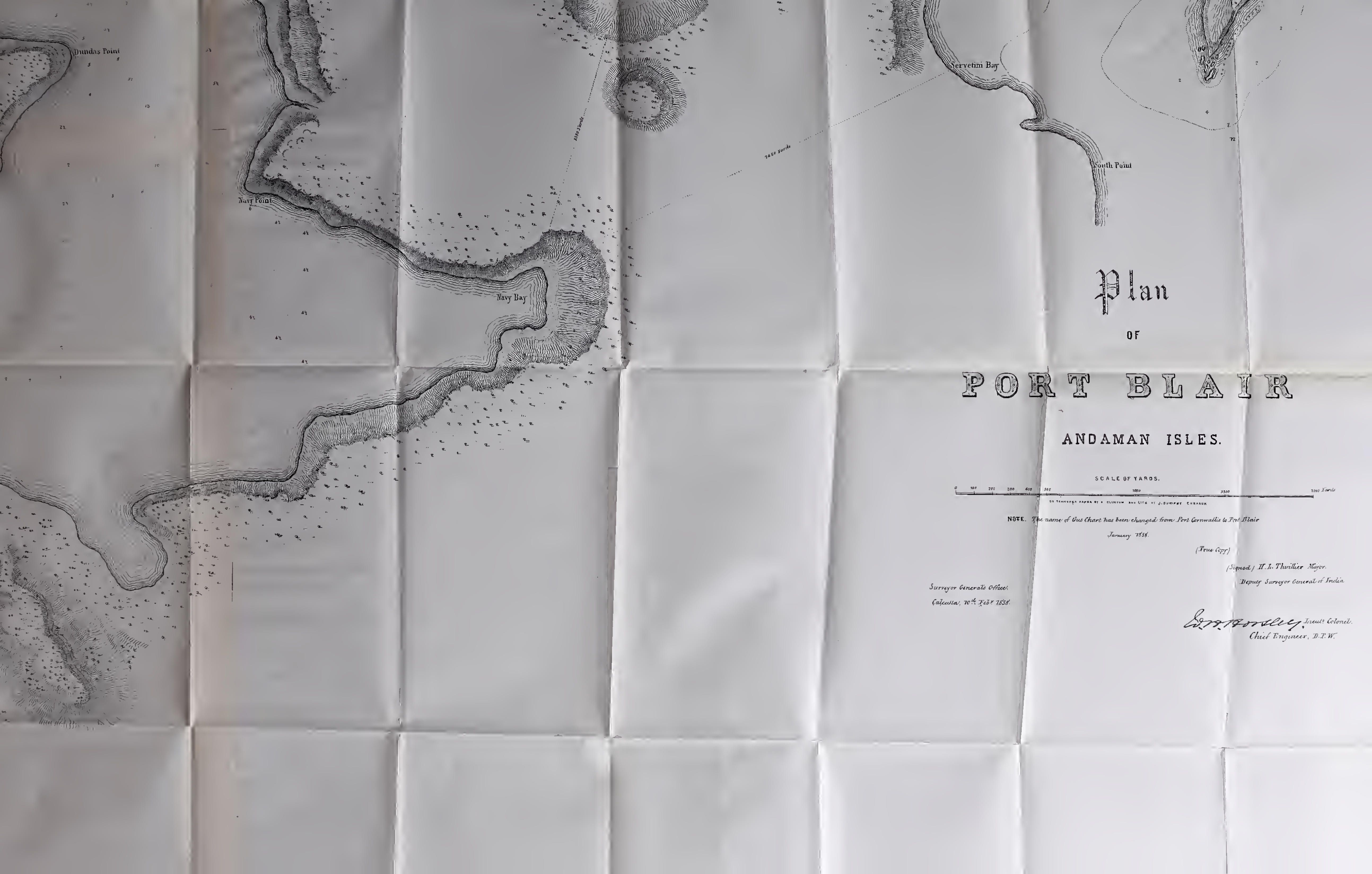
No. 3,415, dated Madras 23rd August 1861.

Watering Cove
Smith Point
MANGROVE BAY
Shore Point
Ranger Reef
Ariel Hill
Point Hood
Dundas Point

Navy Point
Viper Island



Watering Cove
Smith Point
Command Point
Shore Point
North Point
Perseverance Point
Ranger Reef
Chatham Island
Blair Reef
Point Hood
Ross Island
Aberdeen
Atalanta Point
Phœnix Bay
Hospital Beach
Dundas Point
Servetini Bay


Dundas Point
Navy Point
Navy Bay
Servetin Bay
South Point
Plan
OF
PORT BLAIR
ANDAMAN ISLES.
SCALE OF YARDS.
0 100 200 300 400 500 1000 1500 2000 Yards
NOTE. The name of this Chart has been changed from Port Cornwallis to Port Blair
January 1858.
(True Copy)
(Signed) H. L. Thuillier Major.
Deputy Surveyor General of India
Surveyor General's Office.
Calcutta, 10th Feby 1858.
Lieut. Colonel.
Chief Engineer, D.P.W.

has been a great desideratum, and my own thoughts and wishes have long been directed to the attainment of one; but I have turned my attention to the sea-coast of India for the purpose; an insular position has many and very obvious advantages over one on the mainland. I shall with all my powers second your recommendation of the general principle, and, as far I am at present able to form an opinion, I would advise Curlew Island as a site. I think, however, that it may admit of question, whether one of the small Islands in Port Blair may not offer some superior advantages * * * I allude of course not to the large Andaman Island, but the islets in the Port. Dr. Gamach of the Madras service, recently employed there, reports very favorably indeed of the climate. He has sent into the Bengal Government some account thereof, * * which I shall apply for copies of; * * I shall be very glad to receive your opinion on the site in question as compared to Curlew Island".

Arrival at Port Blair.

In accordance with these instructions, I availed myself of the first opportunity which the opening of the season afforded, arriving at Port Blair on the 20th and remaining there till the 25th October. During this time, in addition to my own examination and inquiries, I made myself familiar with the reports by Dr. Gamach in the records of the hospital, and gained from the Superintendent, Major Haughton, who courteously accompanied me every where, much of the information which this report contains.

Position of the Andaman Islands.

On the eastern side of the bay of Bengal, bearing nearly south-west of Rangoon and Moulmein, the Andaman group extends nearly north and south, intersected by the 93rd degree of east longitude, and occupying, with the adjacent Island, a space of about two degrees and a quarter, or from 11°45′ to 14° degrees of north latitude. The great Andamans are divided by narrow channels into north, middle, and south. Their extreme length is calculated at 140 miles, and their greatest breadth in any part is supposed not to exceed twenty miles. Their supposed superficial area exceeds 2,000 square miles; the general contour being an undulating surface of hills descending in elevation from the Saddle Peak on South Island, stated to be 2,400 feet high, to hills of 800 and 300 feet; valleys apparently of considerable extent occupy the intermediate spaces at varying elevation; and these again decline gradually to the sea. The entire surface as far as the eye can

SERIES I. SECTION XI.

reach, is covered with a dense forest of gigantic trees, underwood and twining creepers.

Botany of the Andamans.

The Reverend C. Parish of Moulmein, an accomplished Botanist, who accompanied me to Port Blair, has favored me with the following observations on this head. "The vegetation of the Andaman Islands, or rather of the neighbourhood of Port Blair, as far as I was able to judge of it from passing the shore and by what has been left on the Islands that have been cleared, appears to be very much the same as that of the Tenasserim Provinces. The few plants brought to me by a man, whom I employ as collector, contained nothing unknown to me, except one terrestrial orchid, and my man gave as a reason why he brought in so little, that he saw nothing which did not grow on the coast."

"The wood-oil tree, Dipterocarpus lævis? is extremely abundant, as it is in our province. Lagerstræmia reginæ is there also and Pterocarpus Dalbergiordes? which furnishes the Andaman red-wood. I noticed Calophynum Inophynum in full flower, and a fine species of Cordia which grows also about Mergui."

Botany of Barren Island.

"The valley round the cone of Barren Island, except that part of it which is filled with the black and rugged lava current, upon which no vegetation grows, is covered with long coarse grass, and about half a dozen kinds of stunted shrubs; one of them being a species of Mussænda. (spe?). Upon the cone itself from the bottom to the top are seen, here and there, tufts of a species of Funcus. The only other plants which I saw growing upon it were a few miserably stunted ferns, Nephrolepis hirsutula, Pteris longifolia, Cherlanthes varidus, with a small Psitotum, and two or three species of Bownaya and Vandellia."

"Having enough to do myself in looking after my footing, I did not gather anything, but left it to my collector to do so, reckoning that he would bring me specimens of all the shrubs; but happening to hurt his foot severely, he did not do so, I am therefore unable to say what they were. I may mention that I found a tuft of Dendrobrum formosum growing vigorously and in full flower, on the ground, and among the black cinders of which the cone is composed. The water-sides of this land are dotted with a dense vegetation, but I had no opportunity of seeing what it was."

Geology of the Andamans.

Silicious sandstone crops out from the banks and is seen in masses all along the sea-shore, encrusted with coral wherever exposed to the sea. The shores indeed everywhere are of coral formation, and in many places,

considerably inland where the ground has been cultivated, shells and coral are found at varying depths beneath the surface soil; occasional masses and fragments are seen of agglomerate, with granite, limestone, and varieties of compact lava and scoria intermixed. The surface soil is of a clayey hue, such as is found in Burmah and in the Straits; but in consistence, it is open and porous; and in sinking wells, roots of trees have been found some forty feet beneath the surface; much rich mould is washed down into the bays, which mingling with the sand, causes mangrove to spring up into trees of considerable dimensions. The Islands evidently owe their origin to igneous agency. A reference to the chart will show that they form part of the chain of volcanic action extending in a curved line, commencing in Java and formed by Sumatra, the Nicobars (where the soil is said to consist of decomposed lava), Barren Island, an active volcano, thirty-six miles, and Nacondam rock an extinct volcano forty-five miles distant from the Archipelago, and the hot-springs and mud volcanoes on the coast of Burmah.

Barren Island.

The singular and interesting volcano of Barren Island is always in a state of activity. It lies in the direct course between Java and Port Blair. In 1789 Lieutenant Blair describes it then in a state of "violent eruption; large volumes of smoke and vapour issuing from its summit, and large masses and rock being ejected to a distance." In 1803, Horsburgh relates "that the volcano exploded regularly every ten minutes, projecting each time a column of black smoke perpendicularly, and in the night a fire continued to burn on the east side of the crater." The Island is nearly circular and inaccessible, except at the north-west surface where there is a breach in the external shell, of apparently the original crater, exposing a cone ascending nearly 1,000 feet, the summit of which throws out volumes of smoke.

The ascertained diameter of the Island is 2,970 yards, that of the base of the ascending cone 2,100 feet. Both Lyell and Humboldt state "that the sea fills the circular valley around the cone." It is not so now, this space varies in breadth from 50 to 100 feet, and has a general elevation of some 20 feet above highwater mark; the surface consisting of black basaltic honey-combed masses, or small and large spongy-looking blocks exceedingly difficult and dangerous to walk over, from their innumerable spiculæ and their loose texture.

We landed on the Island at day-dawn on the 26th October; as we reached the shore, the water gradually became hotter, steam ascended from apertures on the beach into which the salt-water flowed and was ejected with force. A thermometer inserted into one of these apertures immedi-

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ately ascended to 170°. It is very evident that the original volcano must have been what is denominated "a subsidence or depression," in the centre of which has risen up the present "cone of elevation or eruption," so that now the latter ascends about 1,000 feet below that. The centre cone describes an angle of 40°, and being covered with fine ashes and loose scoria, the ascent and descent is attended with much toil. On the summit is a small crater of depression, on the sides and wall of which, sulphurous acid in the form of steam issues from deep vents and numerous apertures. Quantities of sulphur and gypsum are encrusted around these. The upper third of the cone has firmer footing, being cemented by gypsum or sulphate of lime, and here, in many places, the ground was disagreeably hot, even to stand on. A thermometer introdueed into one of the fissures, instantly rose up to exactly the boiling point of water.

Externally, on the sea-face, the strata are observed to dip from the centre outwards, describing an angle of about 35°, and this slope evidently continues beneath the surfaec of the ocean on three sides of the Island, for there are no soundings at 150 fathoms, except at the north-east angle, where at a quarter of a mile from the Island, the depth varies from four to fourteen fathoms. There is a wounderful transparency in the water around this and the Andaman Islands in certain places; at the latter depth fishes are seen swiming about, the bright sand, rocks, shells and beautiful trees of coral are as distinet as if they were on the surface.

Inhabitants of the Andaman Group.

There are no permanent residents on any one spot of the Andamans, the tribes being constantly in motion from one part of the Island to another, or from Island to Island in search of food; seldom remaining above four or five days in one place. For a long while they were considered to be cannibals; but it is now acknowledged, that there is no more truth in this assertion than there is in the other, viz. that they are dwarf Negrilloes, descendants from a tribe of Caffre slaves cast ashore during the period the Portuguese had settlements in the east. It is now generally allowed that they are the pure aborigines such as are found in New Guinea, &c. In features, size, color, &c. they reminded me very much of the Kaders and Mulcers &c., of our Annamally and other mountain tribes in India, and they have a strong resemblance also to "jungle men" who reside in the depths of the Malayan Peninsula. Mr. Blyth, the able Secretary of the Asiatic Society, informs me that their skulls are distinctly Caucasian.

I frequently examined the three men captured and sent to the coast for education, and also had the good fortune of an interview with a party, when at the Andamans. They are very quiet and docile. Have

remarkably imitative powers; in color, sooty-black; teeth, large; in height 4 feet 8 inches to 10 inches; wiry and muscular; none possess the projecting heel, the lips and nose of the Negro; hair grows in tufts and is always kept short; and their bodies are tattooed all over. In the search for their food, whether on land or on water, they know no fear, two or more will dive into the water to capture a large fish; and during our early occupation of Port Blair, many bold and successful attacks have been made on the plantain gardens, and on the Convicts at work; who after being deprived of their saws, axes, crowbars and hoes, were sometimes made to dance with the savages before separating; naturally however they are shy, exhibiting a want of confidence, the result possibly of repeated betrayals by parties from Acheen and the Malay Coast who, under the pretence of visits in search of bird nests, beche-de-mer, &c. &c., bear them away into slavery.

When resistance is offered to their attacks on our Convicts, they resort boldly to their bows and arrows. In self-defence our fire-arms have occasionally to be used; and now the savages have such a dread of these, that they are rarely seen near our settlements. At the chance interview I had on the island, the man who approached the boat for plantains, threw aside his bow and arrows as he advanced to receive the plantains offered; but on observing the firelocks belonging to the crew ranged beneath the seats, he gradually drew back and joined a number of his people who were squatting down near their rude huts on the borders of the forest, and afterwards proceeded towards the place where he had placed the plantains received from us.

Pigs and rats both having peculiarities, not found elsewhere, are the only mammalian animals yet seen on the island; no monkeys have been observed. Birds are not numerous; but nearly all reptiles seen on the coast are found. Leeches are very numerous in the forest, as are also a troublesome leach that burrows under the skin, causing much irritation.

British connection with the Andamans.

A penal settlement was formed at Port Blair on the east side of South Island, under the superintendence of Lieutenant Blair of the Indian Navy in 1789, where the Convicts appeared from records to have prospered and retained their health. But from some cause (not recorded) the settlement was removed to Port Cornwallis in 1792, which proving pestilential was totally abandoned in 1796. In January 1858, after a very careful survey of every part of the island, Port Blair was again selected as a Penal Colony for all India. It is a magnificent land-locked bay,

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opening to the east and extending to the west and north upwards of seven miles, varying in width from one to three miles, and for five miles inland ,offering secure anchorage for ships of any size. There are many other fine harbours amongst these islands: but reasoning from analogy, no position offers a better prospect of success, sanitarily considered, than this, the selection of Drs. Mouat and Playfair of the Bengal army. It is on the extreme south of the group and possesses a spacious bay, (Port Mouat) immediately opposite to it on the west side of the island, with, judging by observation, not above five miles of intermediate forest. As this position gradually becomes opened up, a wholesome percolation of pure sea breeze will be secured to it, free from the influence of the force of the monsoons passing over a wide extent of jungle and morass; moreover, the water-shed being towards the west of the island, there is more swampy ground there than on the east side.

Port Blair, its Islands and Promontories.

The relative positions of Ross Island at the mouth of this port, as compared with Curlew Island and Point Amherst, recommended in a former report as a marine sanitarium for European troops, are as follows :—

Port Blair distant from Sandheads .... 696 miles.
Amherst do. do. .... 660 ,,
Curlew Island distant from Amherst............ 30 ,,
Port Blair is in 11° 43' N. Lat., and 92° 48' E. Long.
Curlew Island, 15° 34' do. and 97° 43' do.
Amherst Point, 16° 6' do.

Ross Island.

Ross Island lies right across the entrance into the port, bearing north and south. It exceeds one mile in length, its breadth being upwards of three-quarters of a mile. Except a few old forest trees, the entire surface of this island is now occupied by experimental gardens, barracks, &c. for the Naval Brigade and Convicts' storehouses, bazar and Officers' bungalows. The island rises about 150 feet above the sea, and on the summit the Superintendent's house is placed. Six wells have been sunk, but the water is scanty and indifferent. This is the only one of the group of islets which is so placed as to hold out a prospect of being made available for purely sanitary purposes. But it is not to be compared in this respect to Curlew Island. It is wanting in the fine well-protected open beaches, undulating surface, extent of area, and good water which the latter island possesses.

Chatham Island.

Chatham Island is two and a half miles up the bay. The water here is so deep that a 1000 ton ship can load and unload along its shore on one side. The island is saddle-shaped. 600 yards long and

300 broad. It is entirely cleared. It formed the original settlement of Lieutenant Blair, and is chiefly covered with beautiful green sward, "doop" grass introduced in his time and now growing luxuriantly wherever transplanted. Two wells have been sunk on this island, and the water is good. The Commissariat Officer, Surgeon, and Deputy Superintendent reside here with a party of Convicts. The position of this island is certainly very picturesque; but surrounded as it is in the main by heavy insalubrious forest and dense mangrove belts, apart from its diminutive area, it is useless as a sanitarium on any scale.

Viper Island.

Viper Island is two and a half miles further up the bay, west. In length and breadth it is less than Ross Island, but it somewhat exceeds it in elevation. It has three good wells of water and is occupied by a large number of Convicts who cultivate here, as they do on the other islets, Indian vegetables, sugar-cane, cotton, jowarry, bagera, Indian corn, tobacco, yams and plantains in abundance, and also look after nurseries of cocoanuts, beetle, nutmeg, oranges, mangosteen, and in fact all tropical fruit trees which are found in India. This island is quite land-locked, shut up entirely from the sea breeze, surrounded at a short distance by dense jungle and mangrove, and never can be thought of as a place possessing the requisites necessary to form a wholesome marine sanitarium. Beyond Viper Island are Bird and Oyster Islands; but the water shallows, and at low ebb is barely ankle deep at two miles out. Several creeks, many of them navigable for boats at highwater, pass up from the head of this bay.

Promontories.

Spurs of the high land which enclose this bay to the north and south separate it into well-sheltered deep coves. On the north side nothing has yet been done in the way of clearing. But on the south side at Atlanta Point, opposite the Ross Island, and on two or three other localities, small clearings have been made; but the chief of these is Aberdeen at Atlanta Point, where tropical cultivation of every description advances with strength, vigor and rapidity. As these Promontories become more cleared, and free openings are made in the forest from sea to sea, we will then doubtless be able to select a desirable position for a sanitarium. But at present there is no spot on or around the islands which I could recommend as equal in this respect to Curlew Island in the Gulph of Martaban.

Salubrity of the Settlements.

On its early occupation, when there was little or no shelter, when drainage could receive little consideration, and where such huts as were raised, were surrounded with standing, or, what was worse, felled-jungle, the mortality amongst the Convicts was excessive. The men of the

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Naval Brigade also suffered much at this time from bowel disorders an febrile affections. But gradually as the islets in the bay, &c., becam cleared and cultivated, the sickness lessened; and now, one of the mos unhealthy periods of the year, immediately after the rains, the sickne is not inordinate. I never saw Europeans look in more robust healt than the 100 men of the Naval Brigade, none being on the sick list Officers and children also have an appearance of health which, except o the hills, is never seen in India. With the natives of India, scurvy i all its forms and complications is, and has always been, their grav disease; the result doubtless of malarious influence on a depressed min favouring cachexia, or that morbid condition of the great sympatheti system of nerves which in the first instance deranges, and then vitiat the nutritive and reproductive organs; sometimes the symptoms a preceded or accompanied by pyrexia, but as frequently this is altogeth absent. Gradually as the forest became cleared and good vegetabl were procurable in abundance, the gravity of the diseases decreased, a will be observed from the four tables annexed, viz:—first, showing th strength on each locality at the date of my visit; second, their specif diseases; third, a tabular view of the sickness and mortality amongst th different races for 1859 and 1860; and fourth, a tabular view of th disposition of the Convicts on the settlement from its foundation up to th date of my visit.

A.

Strength and General Report of Convicts, Port Blair, 30th Sept. 1861.

	Women.	Men.	Total of each Station.
Ross Island.			
Convict Police.........	...	30	
Self-supporting Convicts.	13	142	
Exempt from labor.....	...	1	
Sick.....................	...	39	
Laboring Convicts......	46	379	650
Atlanta Point.			
Convict Police............	..	9	
Self-supporting Convicts.	7	36	
Exempt from labor......	...	...	
Sick.........................	..	...	
Laboring Convicts........	44	323	419
Chatham Island.			
Convict Police...........	..	20	
Self-supporting Convicts	1	13	
Exempt from labor......	...	...	
Sick........................	...	34	
Laboring Convicts.........	...	225	293
Viper Island.			
Convict Police...........	...	23	
Self-supporting Convicts	11	38	
Exempt from labor.......	...	...	
Sick........................	...	53	
Laboring Convicts......	24	448	567
			1929

	Ross Island.	Atlanta Point.	Chatham Island.	Viper Island.	Total.
Last report total............	658	418	292	566	1,934
Received.......	10	7	5	10	32
Total............	668	425	297	576	1,966
Transferred...	15	6	4	7	32
Died....	1	...	...	...	1
Escaped........	...	..	...	2	2
Released.......	2	...	...	...	2
Remain this day..........	650	419	293	567	1,929

B.

Present State of Sick in the Settlement Hospitals, Port Blair, 21st October 1861.

Specific Diseases.

Anasarca.	Atrophia.	Beriberi.	Dementia.	Diarrhœa.	Dysentery, Acute.	Febris, Remittens.	Fractura.	Hæmorrhois.	Ophthalmia.	Rheumatism, Acute	Rheumatism, Chron.	Scorbutus.	Syphilis, Cons.	Ulcers	Dysentery, Chron.	Total.
1	3	1	1	21	10	1	1	1	2	3	6	12	1	35	4	103

C.

Comparative tabular view of the Diseases by which the greatest amount of sickness and mortality have been occasioned amongst the different races located at Port Blair in the Andamans, during the years 1859 and 1860.

1859.	Average daily numerical strength.	Average daily number of sick per cent.	Scurvy. Rate per cent. admission on average strength.	Scurvy. Rate per cent. of deaths.	Fevers. Rate per cent. of admission on average strength.	Fevers. Rate per cent. of deaths.	Diarrhœa & Dysentery. Rate per cent. of admission on average strength.	Diarrhœa & Dysentery. Rate per cent. of deaths.	All other diseases. Rate per cent. of admission on average strength.	All other diseases. Rate per cent. of deaths.	Per centage of admissions on average strength.	Per centage of deaths on average strength.	Total number of cases treated.	Death per. cent. on number treated.
Convicts, Natives of India ..	1,765	18·75	9·35	6·01	67·65	18·58	31·38	15·07	67·82	23·34	176·20	63·00	3316	33·53
Do. do. of Burmah.					No Burmese in the Settlement.									
Sepoys, Natives of Madras, present from 1st July only.	123	9·10	...	...	108·90	0·81	13·80	...	50·40	...	173·10	0·81	214	0·46
Naval Brigade, Europeans...	160	18·00	0·62	..	144·37	0·62	62·5	3·12	86·87	0·62	294·37	4·3	486	1·4
1860.														
Convicts, Natives of India ...	1,890	13·41	16·53	3·32	63 65	5·01	13·73	2·06	30·61	3·38	124·16	13·79	2584	10·10
Do. do. of Burmah*	116	6·53	2·57	0·85	78·12	1·72	12·03	1·72	24·91	1·72	117·69	6·01	137	5·11
Sepoys do. of Madras..	118	17·7	1·6	...	371·1	5·0	40·6	3·3	82·2	...	495·9	8·3	595·	1·6
Naval Brigade, Europeans...	149	13·33	1·34	...	120·80	1·34	46·97	...	61·67	...	230·87	1·34	358	0·56

* This for 10½ months only and includes a few Chinese.

SERIES I.
SECTION XI.

D.

Tabular view of the disposition of the Convicts at the Penal Colony of Port Blair, from its foundation in Jan. 1858 *to Oct.* 1861.

Years.	Remained.	Received.	Total.	Died.	Escaped.*	Released.	Remaining.
1858	......	1,949	1,949	421	178	6	1,344
1859	1,344	1813	3,157	†1,131	158	58	1,810
1860	1,810	733	2,543	273	43	25	2,262
‡1861	2,262	737	2,999	206	47	766	1,929

Climate of the Andamans.

On this important subject it would be rash, even with our experi-nce of a four year's residence, to make any positive assertion; for as yet he ground can hardly be said to be broken on the main island. But e may fairly infer that with the enforcement of strict prophylactic neasures, as settlements are formed on the main, the climate there will ot be inferior to what it is now ascertained to be on the islets in the ay. There it is much allied to what we find in the low-lands of Ceylon nd our Straits' Settlements. But in my opinion superior to both, partly rom being somewhat further to the north, partly from the limited locali-ies occupied being now kept strictly conserved, and partly from the purity f the atmosphere, the little variation in climate throughout the year nd its moderate temperature in the shade. Inquiries lead me to infer hat the rain-fall on the Andamans is a sort of medium between what we nd in our Straits Settlements and in Burmah, *i. e.*, that rain falls gene-ally throughout the year as at Singapore, and less continuously during he south-west monsoon than in the British Burmah. In fact, in this espect, as well as in temperature, the hurricanes which pass over them nd the numerous atmospheric and electric disturbances, these islands bear more near resemblance to the island of Java (and probably Sumatra) han any other of our possessions, and I have little doubt, that they will e found when opened up, to possess many of the marvellous general

Many under this head return, on which they appear under "received."
Eighty-seven of these were executed.
The return is made up to 30th September of this year.

SERIES I. Section XI.

properties of vegetation and reproduction which that island has. March and April, and September and October are the most insalubrious months. The skies are clouded during the rainy season, and although the direct rays of the sun are very powerful, there is a pleasing coolness always in the shade. There is no cold weather, but a cool sea breeze always insures comfortable and refreshing rest at night. The following table gives the average meteorological observations since the occupation of the island in 1858.

Years.	Mercury Barometer.	Thermometer in shade.			Sun 4 P.M.		Rain fall.	Rain days.
		Min.	Max.	Med.	Min.	Max.		
1858 ..	29·90	71	89	81	78	110	120	188
1859...	29·92	73	90	81	73	115	110	165
1860...	29·66	70	90	81	74	110	112	171
Yearly average rain depth and days......							116	165

A separate return is annexed of the fall of rain, &c. in 1861, contrasted with that registered at Moulmein; this amount is considerably above the average in both places for an ordinary season.

Convict discipline at Port Blair.

When a batch of Convicts arrive at the Colony, quarters are assigned to them; their fetters are knocked off; they are told off into sections of twenty-five men under gangs-men, and they are immediately set to task-work, for which they are paid at the daily rate of one Anna and nine Pice, with this they purchase their food from the ticket-of-leave Bunniahs, who have established themselves on the different settlements, and who procure their supplies from the imported Government stores and from the produce of the experimental farms. About 1,900 Rupees was realized from the latter source last year. There are now 284 ticket-of-leave men, nearly all of whom are self-supporting, earning their livelihood as bunniahs, washerman, coolies, bakers, tailors, shoe-makers, barbers, shopmen, potters, fishermen, charcoal-dealers, dyers, bamboo-men, fowl-breeders, grain-grinders, carpenters, bricklayers, &c., &c. Generally speaking, Convicts at work look stout and healthy; they merely wear a small ring round their ankle. In the early days of the settlements they worked in heavy irons and were always trying to escape; now the old hands never run away, and those who do so are invariably fresh importations. Pleased with the freedom allowed them escapes continued amongst new comers; but they generally soon returned, driven in by hunger or fever, or torture from insects, or perhaps by the savage aborigines, who annoyed at finding them without

SERIES I. SECTION XI.

their heavy irons, conduct them close to the settlement, good humoredly explaining to them that they desire their return with their irons on. Major Haughton has now introduced an iron collar, which he puts on all threatening or attempting to abscond, and which the savages would be unable to remove without first taking the wearer's head off. The use of this collar is explained to all new comers with good results.

Prospects of the Penal Colony.

Hitherto, sanitarily considered, nothing could have been more judiciously effected than—first, the selection of Port Blair; and second, the clearing and cultivating the islets in the bay as healthy places of residence for the European and Convict establishments, &c. But the main island must now be opened out more effectually, and none desires more than Major Haughton to see this done. In his numerous nurseries and some small plantations he shows what the island will produce. But it is not possible for him with his other manifold duties, to undertake himself the onerous task of felling and planting on a large scale. I think that the climate and soil are peculiarly favorable for cotton and sugar-cane. Tapioca too, of which there is a large export from the Straits for conversion into starch, might be grown here to any extent; but as already shown there is little in the shape of tropical vegetation that will not thrive on these islands. I forward a copy of Lieutenant Blair's original chart up the bay, which shows the three cleared islets and Aberdeen Point. Making these the base, I would now recommend (this is the season for felling) that four strong gangs be detached daily from the settlements to work at the two extremes of the black lines shown in the chart, and that a depth of forest equal to a square acre be removed from sea to sea. A road should then be run through the centre of this clearing and the ground on each side cultivated. Gradually thereafter, the entire space to the bay would be cleared, but in the meantime the isolation by means of these clearings would materially improve the salubrity of Aberdeen, the site for the future capital of the Colony. But in order to encourage a Colony to grow up side by side with the penal settlement, the most liberal terms should be held out to two or three (not more) for that stamp of planter who has been accustomed to fell annually his 80 to 100 acres for coffee, in forests as dense as are to be found on the Andaman Islands. The nearest Nicobars are 72 miles south, and the Cocos 40 miles north of the Andaman Islands; cocoanuts are indigenous on these Islands.

Conclusion.

I have now brought to a close the series of my reports on mountain and marine sanitaria.

SERIES I. SECTION XI.

It will not, I presume, be questioned by any one that military and sanitary considerations are too closely interwoven, to render it possible to separate them.

This being admitted, we have the undeniable fact before us, that by locating a portion of our English soldiers constantly on healthy hill ranges, not only will they be readily available on emergencies, but their efficiency will also be secured.

Permit me therefore very earnestly to urge, that hereafter instead of cantoning in the plains the entire European force required within any Division of the Army, that advantage be taken on all occasions of elevated regions in the neighbourhood, for the erection of a portion of their barracks so as to admit of a happy and healthful interchange from below to above.

The soldier will then have something in prospect to break the *ennui* of his barrack life; his mind will have ideas to dwell on more humanizing than associations connected with bazar brothels, and the hope of the pleasing change in prospect will go far to keep him in health, especially if rational, mental and physical, engagements be otherwise secured to him.

In my reply to the Royal Commissioner's queries on the sanitary state of the Army in India, and from information collected subsequent to the despatch of that document, I have attempted to show in my several reports to Government.

1st.—That frequent change of air is the most effectual mode of preserving a high standard of health in India.

2nd.—That by the location of a portion of our European troops on elevated mountain plateaux, not only would they be available on emergencies, but their health and efficiency would also be secured.

3rd.—That almost every military station in the Southern Peninsula, has contiguous thereto healthy mountain ranges adapted for Europeans.

I.—In the Centre Division.

The *Green Hills on the Shevaroys* are suitable for freshly imported recruits, time-expired men and invalids, preparatory to embarkation, and for the families of European soldiers proceeding on service.

II.—In the Southern Division.

The *Pulney Hills* are available for the introduction of a healthful system of interchange from the plains for the European force stationed at *Trichinopoly*.

III.—In the Mysore Division and Malabar and Canara.

That a Wing of the Regiment at *Cannanore*, convalescents from *Bangalore*, and a *weakly Regiment* from any part of India, should be accommodated at *Wellington*. Now that the Railway is open from the sea to the east and west, Convalescents from

Bombay and Lower Bengal

might be accommodated on *Kotagherry* on the Neilgherry range, or on some other portion of the plateau, any portion of which far surpasses for this purpose the mountain sanitaria in these Presidencies, the chief of which I have visited.

IV.—In the Ceded Districts.

A Wing of the Regiment stationed at Bellary should be accommodated at *Ramandroog*.

V.—Hyderabad Subsidiary Force.

Beder, Grant's range on *Golee Konda* in the Northern Division and *Ramandroog* are the only available elevated sites yet known to which convalescents can be conveniently sent from this Division of the Army.

VI.—Jaulnah Force.

Booldana and Chekulda are favorable localities to canton a portion of this force.

VII.—Nagpore, Saugor and Nerbudda.

Chindwarra and the *Muthoor range* are centrally situated for the location of a portion of the European Army garrisoning these territories.

VIII.—Curlew Island

In the Gulph of Martaban should be made the great marine sanitarium for all India.

I respectfully submit that a recognized system, such as the above, should be established, and put into force as opportunities offer; not to be subject to alteration by parties *holding special views*, unless they could satisfactorily show that that fixed on was injurious.

SERIES No. 2.

MYSORE DIVISION.

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MYSORE DIVISION.

THE area of the province of Mysore is 37,000 square miles, and it lies between 74° and 79° East longitude, and 12° and 15° north latitude. SERIES II. Topography.

The general character of the soil is a rich red earth, containing iron on the heights and a clayey mould in the valleys.

It is enclosed on three sides by the southern, eastern and western ghauts, which are high ranges of mountains having in many parts dense forests of teak. Ebony, the sago-palm, sandal-wood and bamboo jungle, extending from seven to ten miles from their base. The Toombuddra, the Palar, the Pennaur, and many other rivers which intersect and fertilize the continent, have their sources in these hills.

The general aspect of the country is an undulating and elevated table-land with isolated and detached ranges of hills which attain a considerable elevation. Towards the north the country is open, the descent being rapid and perceptible; as for instance, at Sera, where the height above the sea is 2,223 feet, the declension in ninety miles exceeds 600 feet. Its north western angle approaches to within fifteen miles of the sea; its southern point is fifty, and its eastern side one hundred miles, from the coast; its extreme length is 257, and its breadth 238, miles. The province is divided into four Districts, viz., Bangalore, Mysore or Astragram, Chittledroog and Nuggur.

The chief Passes to this elevated region are,

The Nuggur Pass.
The Palicaud Pass.
The Amboor Pass.
The Guzzelhutty Pass.
The Chengama Pass.
The Attoor Pass.

And barometrical observations give the altitude of the mountains and plateaus as follows:—

Bababoodere mountains		6,347	above sea level.
Sevagunga	... ...	4,600	,,
Nundydroog	... ...	4,600	,,

SERIES II.

Hassan	3,269	above sea level.
Bangalore	3,000	,,
Chinroypatam	2,826	,,
Colar	2,800	,,
Seringapatam	2,558	,,
Baitmungalum ...	2,519	,,
Mysore	2,513	,,
Nundium	2,282	,,
Oospettah	2,270	,,
Kankankully	2,228	,,
Naikenary	2,221	,,
Madoor	2,102	,,
Peddanaik Durgum...	1,007	,,
Hurryhur	1,831	,,

Geological Features. The rock forming the basis of the whole country is of primitive formation; masses of granite, gneiss, or laterite, protruding also through the soil in many places.

The peculiar geological features of the country are the isolated hills or droogs, which are usually rounded naked masses of primitive rock, rising above the surface of the table-land and usually fortified with successive lines of works, carried tier above tier from the base to the summit. The chief of these are Nundydroog, Chittledroog, Severndroog and Astradroog.

Climate. The Mysore country has always been celebrated for the mildness of its climate. The nights are seldom hot, and the mornings and evenings are always cool. But to strangers the climate often proves treacherous; for the cold of the mornings followed by the heat of a tropical sun causes the thermometer frequently to range 40° in the twenty-four hours.

Salubrity. Many parts of the province are subject to severe visitations of epidemic remittent fever, from which Europeans appear to suffer less than natives; several localities that have been peculiarly productive of fever after a lapse of a few years, become again perfectly healthy. Thus Nundydroog, thirty-five miles from Bangalore, a military station, was for eighteen years abandoned (in 1823), on account of its extreme unhealthiness, but is now again free from febrile disease; and other places have similarly changed their character.

Government. Including the principality of Coorg, the entire country of Mysore is at present under the general management of a Commissioner appointed by the Supreme Government, and the Military stations in the province are Bangalore, French Rocks, Mysore, Hoonsoor, Hurryhur and Mercara.

SECTION I.

Bangalore.

The station of Bangalore, the head-quarters of the Division of Mysore, is 205 miles distant from Madras; the Railway is now being constructed the entire distance.

The Cantonment was first garrisoned in 1809. It stands on an elevated ridge of ground running east and west, and sloping to the north and south. On the old race-course to the extreme right, the new Dragoon barracks are being built, and are expected to be fully completed in about two years. Then come the Horse and Foot Artillery; next in order are the quarters of the European Regiment of Infantry, at present occupied by the Dragoons. Immediately contiguous to these, on the same line, are their temporary barracks, which it is contemplated to turn into an Arsenal so soon as the new Dragoon barracks are occupied. The places of Arms of the Native Regiments of Infantry, with their quarters contiguous, complete the line to the left. The Native Cavalry are thrown back to the north near the Ulsoor tank.

Thermometrical observations at Bangalore during a period of five years give the following results:—

The annual mean temperature in the shade is...........	76	degrees.
The average highest range..........................	81	,,
Do. lowest range..................................	69	,,
Do. variation in 24 hours..........................	10	,,

With an exposed Thermometer.

The mean range during the months.		The highest in the sun.	Extreme variation in the open air.	Remarks.
In January..	65	102	51	Cold and foggy with heavy dews.
,, February	75	112	51	
,, March.	76	112	48	Strong dry winds during the day, but nights never oppressive.
,, April........	79	111	47	
,, May...........	81	110	43	
,, June..........	77	102	36	
,, July..........	74	93	28	The south-west monsoon prevails. The sun is observed and the weather is very agreeable.
,, August.......	73	98	34	
,, September....	73	105	40	
,, October..	74	108	42	The north-east monsoon rains in October. After which the weather is cold and foggy, with dews at nights.
,, November	71	108	44	
,, December	71	109	49	

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The average annual fall of rain is 45 inches.

Almost every species of tropical and European flowers, fruits and vegetables, grow luxuriantly and attain to great perfection at this station. A Horticultural Garden has been recently established, under the superintendence of the Conservator of Forests, with a skilled gardener from England, acting under his orders. As no part of Southern India is better adapted for carrying on experiments in agriculture, much good is expected to result from this establishment, from which it is proposed to distribute plants to the public.

Bangalore is one of the finest climates in India. No part of the Mysore territories is better situated, or more free from the influence of miasma; remittent fever is almost unknown there; the climate is particularly congenial to the European constitution; disease of every order may be traced to imprudent exposure, and convalescence is usually rapid. Although the rays of the sun are powerful, in the shade it is always agreeable, and blankets are for the most part indispensable at night.

Hitherto the prevalent diseases amongst Europeans have been ephemeral fevers, dysentery and hepatitis. But of late years syphilis has so increased, that it may be said to be the disease of the place. Convalescence from all grave diseases is expedited by a change to the coast or to sea. The European troops are almost the only sufferers from hepatitis; the exciting cause being probably exposure to night air, or to draughts in the barrack rooms, when the skin is moist, as after drill. The perspiration becoming suddenly checked, the mass of blood is directed to the liver or large intestines, thus causing inflammation of these organs.

In the end of 1856, the Garrison Hospital was situated in the Fort, about two miles from Cantonment; now the sick of the Garrison are received in a building formerly occupied as a hospital by one of the Native Infantry Regiments. The situation is central, but the space is cramped, being surrounded by other buildings and being too contiguous to the bazar. The building itself is very ill adapted to the reception of sick. It is badly ventilated and much too contracted in space; unwieldy square pillars run along the centre of the building, the only support to the roof which is much too low. The windows are immediately opposite the patients' heads; if these are opened, the draught is too direct on them; and if closed, the air becomes unwholesome.

Formerly it was one long ward 90 feet in length; now, a wall divides this space into two wards, one for Europeans the other for Native sick; and adjoining the building is an apartment for two women or three children, or for patients suffering from contagious disorders, delirium tremens, &c. Very recently a case of confluent small-pox occupied this ward; at the period of my visit a violent case of delirium tremens had possession of it. Cases of this sort are of frequent occurrence; and, then of course, neither females nor children can have admittance.

The European pensioners, including their families, now residing at Bangalore exceed 1,000; and their numbers are daily increasing. Their sick and those of Corps leaving the station, both European and Native, convalescents passing through *en-route* to the hills or elsewhere, in addition to the sick of the permanent residents of the station and of recruiting detachments, and invalids resorting thither,—in fact, all parties of the public service who cannot claim medical aid elsewhere, are received at the Garrison Hospital. There is no dead room.

The building used as a privy is situated directly between the hospital and the Assistant Apothecary's dwelling, at a distance of a few feet only.

The duties devolving on the Garrison Surgeon (who is also Superintendent of Vaccination in Cantonment and in four talooks around it) at Bangalore, have of late years become so laborious from the large number of invalids and others resorting thither, that Government have appointed an Assistant Surgeon to aid him. Having had personal experience of the duties of the office and of the evils resulting from imperfect accommodation at the hospital, which renders it necessary to treat several cases in their own houses, who should be admitted into hospital, I would earnestly urge that appropriate and creditable accommodation be erected on a suitable spot for the reception of the sick of this the chief sanitary station in our Presidency. As the case now stands, the advantages which an invalid derives from the salubrious climate of Bangalore, are lost so soon as he enters the present hospital.

In November 1857, when performing the duties of Garrison Surgeon, I brought to the notice of the principal Medical Officer that the hospital Nurse was obliged, in addition to her other duties, to supply water, not only for all hospital purposes, but for the Medical Store Department also. I recommend that a Puckally be allowed specially for hospital duties, consequent on the increase of sick; a second ward cooly

SERIES II. Section I.

should also be added to the permanent establishment, to attend especially on Europeans.

By a local arrangement of the superintending Medical Officer on the removal of the Garrison Hospital from the Fort to Cantonment, medicines were directed to be supplied from the Garrison Stores to the Detachments and others, resident in the Fort, now numbering 400 men; this system has obtained since that date. The expenditure is debited to the Garrison Surgeon who has not control over it, and it imposes extra labor on the subordinates under him. I recommend that the Detachments in the Fort henceforth receive their supply of medicines direct from the local Medical Stores, according to the rates laid down in orders, as is done in the case of supplies provided to all other Detachments.

Medical Stores are admirably arranged, the medicines being placed in alphabetical order. This system of classification is by far the most convenient for examination as well as for general purposes, with the letters of the alphabet printed over the racks in which the medicines are placed. I recommend that directions be given to the Service generally to conform to this plan.

H. M.'s 1st King's Dragoon Guards.

New quarters are now in course of erection on the Race-course, the highest portion of Bangalore, for the European Cavalry Regiment stationed there. They will consist of eight blocks of buildings, each to accommodate 80 men and 4 Serjeants' quarters, giving to each man 144 square feet and 3,000 cubic feet of air. The blocks are to be terraced-roofed and of the following dimensions. Centre wards 240 feet in length, 24 feet in breadth, and 24 feet in height, with an inner verandah on both sides, 12 feet in breadth, and an outer one 10 feet in breadth; privies, urinals, wash-houses, cook-rooms, &c., will be conveniently situated for each block.

It is proposed to construct the hospital on the plan approved and adopted by Government throughout India, in all new buildings for European Regiments. There will be quarters for one Medical Subordinate in the hospital, and for the others within the compound.

The old Dragoon barracks consist of eight blocks of buildings about 130 feet apart, one for each Troop. They are well situated, the ground gently sloping to the north, so that the water readily runs off. The height of these barracks which was formerly twelve feet only, has been doubled; the floors are well raised and there is free ventilation above.

A wall nine feet in height surrounds them, within which are skittle alleys, racket-court, quarters for married soldiers, school rooms, &c.

The hospital is situated outside the barrack square, about 100 yards from the eastern wall. It consists of two buildings; the largest forming three sides of a square, facing the south, is sub-divided into four wards. That facing the south is 100 yards long, the eastward is 60, the west being divided into two wards 34 and 25 feet, respectively: the breadth of each is 18 feet and the height 12 feet. To the north is a Convalescent ward 84 feet by 18, and the same height as the others. Great improvements are now being effected in this establishment. The compound is much extended. A separate hospital for females, better constructed privies, and spacious apartments for stores, are to be erected. The hospital floor which is now flush with the ground, is to be raised. The walls will be made higher, and appropriate roof ventilation introduced, measures very imperatively required.

Since the arrival of this Regiment at Bangalore in December last, up to the quarter ending 30th ultimo, the admissions and deaths have been as follows :—

Average strength.	Prevalent diseases.																			
	Fevers.		Lungs.		Liver.		Stomach and bowels.		Brain.		Rheumatism.		Venereal.		Cholera.		Other diseases.		Total	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
520	110	2	20	3	17	0	74	3	11	2	45	0	169	0	...	...	179	0	625	10

Thus it will be observed that, during the brief space of ten months, the number of admissions into hospital exceeds the entire strength of the Corps by 100 ; the larger number being from syphilis.

Some improvement has of late been made in the bedding of the men in barracks, but not to the full extent required in this climate. The great want is a mattress; and to this want, and to the spare covering at night, the Surgeon of the Regiment attributes much of the sickness of his men during the short period of their sojourn at Bangalore. I coincide with him in this view.

Much inconvenience is experienced both by the Medical Officers and Subordinates from the want of accommodation for the latter in the vicinity of their duties. This is a frequent cause of complaint. I beg to call

SERIES II. SECTION I.

attention to the Extract Minutes of Consultation in the Military Department, No. 2,285, dated 4th July 1857, relating to this subject.

H. M.'s 3rd Battalion 60th Rifles.

The 60th Rifles arrived at Bangalore in December last. The strength of this Regiment at head-quarters is 740. Detachments are stationed at Mysore, Hurryhur and Bellary.

Both the Dragoons and the Rifles were conveyed from Madras to Bangalore by bullock transit without a casualty. The men are chiefly young lads, their average age being about 20. The Rifles now occupy buildings which will be turned into an Arsenal, so soon as the Dragoons get into their own barracks. The Rifles will then enter those above described now in possession of the latter.

The following table exhibits the sickness and mortality in the Regiment at Bangalore, from the 1st January to 30th September 1858.

Average strength at Head-Quarters.	Prevalent diseases.																					
	Fevers.		Lungs.		Liver.		Stomach and bowels.		Brain.		Rheumatism.		Venereal.		Cholera.		Other diseases		Total.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
745	62	2	50	0	41	1	105	3	12	0	35	0	394	0	3	2	207	1	906	9

Here again venereal disease preponderates to a fearful extent, upwards of one-half of the Regiment have been in hospital with it. Since the arrival of the Corps at this station, the books show 394 fresh admissions from this loathsome disorder, out of an average strength of 745. If the subsequent career of these men were traced, we should find that one-third at least became broken down soldiers and unfit for active service in the space of five years. Surely it is time that prompt measures be adopted to stay the progress of this destruction to our European soldiers.

Detachments of the Rifle Corps are now stationed as follows :—

	Average strength.	No. of deaths.
Head-Quarters, Bangalore........	745	9 in 10 months, including 1 drowned.
Do. Bellary......	311	0
Do. Mysore......	93	0
Do. Hurryhur...	100	0

Head Quarters and C Troop Horse Artillery, C Company 2nd Battalion Horse Battery,

The strength of the Artillery and Details at Bangalore at present numbers 302. The barracks are on an elevated portion of ground at the extreme south of the Cantonment. In rear of these the hospital, capable of

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accommodating twenty-seven patients, is placed. The accommodation is too limited both for the European sick and their families, and the public followers attached to the force. Moreover, the building is not only deficient in many comforts, now recognized as essentials in every hospital; but the floors are flush with the ground; the roof is too low and wanting in adequate ventilation.

Having communicated with the Executive Engineer on the subject of the Artillery Hospital, he informs me that for a series of years it has been unfavorably commented on, in annual Inspection reports. The introduction of improvements into the old building, he is of opinion, would be costly and unsatisfactory; he therefore recommends that a new one be erected, and considers that the present is a favorable opportunity for carrying out this very desirable object; as Rupees 18,700 have already been sanctioned for the construction of a separate hospital for the Foot Artillery. Instead of erecting separate hospitals for the Horse and Foot Artillery, he proposes one range, divided in the centre by the surgery, offices, &c., so that two separate establishments might be employed without any interference with one another. He calculates that from the old Horse Artillery hospital, he would be able to secure Rupees 1,300 worth of materials, which, with the above grant, would make a total of Rupees 20,000, and this would be sufficient for the present official year without any further grant. A further sum of Rupees 15,000 next year, would enable him to complete an admirable hospital, capable of containing sixty or seventy patients. The expense as well as inconvenience of two separate hospitals for the Horse and Foot Artillery would thus be avoided. One Medical Officer is usually in charge of both arms, and hitherto the sick have been treated in one building.

Quarters for families of European Soldiers on service.

Quarters for the families of European Soldiers on service are very much required at Bangalore; those now there being utterly inadequate for the purpose and devoid of every comfort for females. Their sick are received into the Artillery Hospital, in consequence of want of space in the Garrison Hospital.

Head Quarters and Left Wing 3rd Lt. Cavalry.

The Right Wing of the Third Regiment Light Cavalry is now at Bellary; the men of the Corps have been very healthy since their arrival at Bangalore; their lines are clean and the drainage is good. The hospital is an admirable one, it has space for twenty-four sick; the floor and ceiling are well raised and the ventilation is good.

20th Regiment Native Infantry.

The building appropriated for the sick of the 20th Regiment N. I. is in a line with the Garrison Hospital, and is of the same objectionable character, having huge square pillars in the centre, occupying space, obstructing

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ventilation and freedom of passage. The prevailing disease in the Regiment has been fever, chiefly of the intermittent type so common to natives on the Mysore plateau. The Regiment have lost twenty men during the past official year; eleven being from cholera. All native troops are peculiarly liable to fevers on their first arrival at Bangalore, particularly when they come from the coast. Regiments coming from the north as from Kamptee, Secunderabad &c., suffer less severely. These are points for consideration at the period of the usual annual reliefs.

Fort Dispensary.

The Fort Dispensary is intended for the temporary relief of those who may be taken suddenly ill in the Fort; all serious cases being at once transferred to cantonments. The strength of the garrison, including Ordnance Department, is 402; nearly one-half of whom consist of Europeans.

Medical arrangements under the Commissioner of Mysore.

Through the courtesy of the Surgeon to the Mysore Commissioner, I have had an opportunity of examining the establishments under the Commissioner of Mysore, quoted in the margin.

At Bangalore.
- Cantonment Dispensary and Bazar Hospital.
- Cantonment Jail and Hospital.
- Petta Hospital, Sudra and Brahmins.
- Lunatic Asylum.
- Leper do.

Nuggur Division.
- Sudra Hospital.
- Brahmin do.
- Jail do.

The Cantonment Hospital in which the poor are fed and treated, is a succession of airy well-raised apartments, each capable of receiving from fifteen to twenty sick. In construction and arrangements, it is superior to the buildings of our Native sick soldiers.

The Pettah Hospital situated near the Fort is better still. It consists of a range of commodious well-raised and well-ventilated apartments for males and females of different castes; there being separate wards for females of good character; and adjoining to it, in the same compound, is a hospital for high caste Brahmins. On the occasion of my visit there were 174 under treatment. The average daily "in-patients" treated is 160; average daily "out-patients" 65. The prevailing diseases :— fever, bowel disorders, dropsies and venereal, and the average operations, of some magnitude, performed is sixty annually.

In the Lunatic Asylum, the insane of the province are accommodated. The males work at rope-making or gardening; the females grind

and clean grain; so soon as any show symptoms of convalescence, they are at once removed to separate quarters.

In the Leper Hospital, each leper has a separate apartment for himself and family, and they cook their own food. The children of the leper usually show symptoms of the hereditary disease with which his blood is tainted before the age of puberty. The usefulness of all these establishments to the poor are incalculable; and Dr. Kirkpatrick, the Medical officer in charge, does all in his power to extend the benefits of them. As Superintendent of Vaccination in Mysore, he has successfully vaccinated during last year 9,791 persons.

48th Regiment N. I.

The strength of the 48th Regiment N. I. is 784, and the sick in Hospital number twenty-seven, the prevailing diseases being quotidian fever and diarrhœa. Upwards of 10 per cent. of the Regiment have proceeded on Sick Certificate since the return of the Regiment from Burmah, about twelve months since, and in Burmah they lost nearly 200 men. Since the arrival of the Regiment at Bangalore, thirty Recruits who have joined from Recruiting Depôts have been discharged the service on Medical grounds alone, and the Medical Officer is of opinion, that about as many more may yet have to be discharged. The Hospital of this Regiment has no Office or Surgery, such as has been provided for the other Native Infantry Hospital at the station; the accommodation for the sick is wanting in conveniences, contracted in space, and ill-provided with ventilation.

1st Madras Fusiliers.

Before entering on an account of the present state of the First Madras Fusiliers it will be necessary to make a brief retrospect of its operations since May 1857, the date on which it proceeded on Field Service to Bengal. Embarking at Madras on the 18th May 1857, they arrived at Calcutta on the 23rd, and were forthwith transported by bullock dâk and river steamers to Benares and Allahabad. The heat was intense, and several men were struck down with *coup de soleil* en route. At both the above places, the Regiment performed important services, having by disarming the disaffected, and by destroying those who had already rebelled, crushed the rising mutiny in lower Bengal. A small Detachment consisting of a Serjeant and twelve men proceeded to Cawnpore to re-inforce the garrison there. They joined at the commencement of the siege, and all perished in the massacre which shortly thereafter took place.

Early in June 1857, the Native troops at Allahabad broke out into open revolt. A body of Seikhs, who took part with the Fusiliers in quelling the mutiny, secured a quantity of mess-stores, which they shared with

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their European comrades. Intemperance thus prevailed for many days to a great extent, the men lay about the Fort, which was at the time extremely offensive from accumulations of filth within, and on the 16th June, cholera, in a most violent form appeared amongst the Fusiliers, and in a few days fifty-seven men fell victims to its ravages. The disease on this occasion was almost entirely confined to the Fusiliers; the natives of the town did not suffer in any way. On the 3rd of July, a party of the Fusiliers under Major Renaud of that Regiment proceeded on towards Cawnpore, but intelligence of the treacherous massacre there having been received and that an overwhelming force was coming down on the small party, the Detachment remained on the defensive until strengthened by re-inforcements under Major General Havelock.

A succession of severely contested actions now ensued, in which the enemy were invariably routed, and the force entered Cawnpore on the 16th July 1857. Our troops were engaged en route with the enemy, who disputed the passage nearly the whole day, and many cases of *coup de soleil* occurred in the force. In the Fusiliers twenty-seven men and Officers were killed and wounded; seventeen of these terminating fatally. On the 29th July, a force of 1,248 composed of all arms proceeded on to Lucknow, in order to relieve the beleaguered garrison there. The monsoon in the meantime had set in; rivers came down, and roads became almost impassable for wheeled conveyances. Camp Equipage and encumbrances of every sort were, therefore, laid aside, and the necessity being urgent, the force pushed on, resolving to avail themselves of such accommodation en route as the villages afforded. On the first day's march, the force bivouacked at 8 P.M., after fifteen hours' fatigue and hard fighting, the Fusiliers having lost in killed and wounded two Officers and twenty-two men. The remainder of the force also suffered severely, and cholera made such ravages everywhere, that it was deemed prudent to make a retrograde march and fall back on Cawnpore. A second ineffectual attempt to advance was made on the 4th August, but our small force was again obliged to retire. On the 11th August, the third advance was made, and again encountering the enemy, the Fusiliers lost in killed and wounded six men. On the following day, the force again retired and re-crossed the river, resolving to await further re-inforcements before making another attempt to advance on Lucknow. The total casualties in the Regiment between the 25th July and the 3rd of August were sixty-three; forty of these were deaths from cholera, and eight from gun-shot wounds. On the 16th August, the Fusiliers formed part of a force which proceeded to attack Nana Sahib in his residence at Bittore. In this affair they lost seven men killed and nine wounded.

On the 21st September 1857, a force amounting to 2,500 of all arms, the Fusiliers included, under command of General Havelock and Sir J. Outram, advanced on Lucknow, and overcoming all opposition reached the Allum Bagh on the 24th idem; the loss in the Fusiliers being seven wounded. Here a Depôt for the sick and stores was formed, and the main column early on the morning of the 25th proceeded unencumbered with baggage, and provided with three days' provisions to force a passage through the city. Severe opposition was encountered; every available position was occupied by the enemy, and our men were mowed down by a heavy fire from the tops of houses, and from under cover of walls. As our small force approached the bridge over a canal, the rebels made a resolute stand, and poured forth from guns in position, and from the adjacent gardens and buildings, so destructive a fire as for a time to arrest our advance. After a short pause, General Neill ordered the Fusiliers to advance and storm the bridge, they immediately rushed forward with a cheer, carried the bridge and captured the guns. This Dr. Arthur, the able Surgeon of the Corps, informs me was acknowledged by all to be the most daring and brilliant charge made during the campaign, no aid being received from our Artillery, which was in rear of the Regiment. Two Officers and several men were killed and wounded at this bridge. A most murderous street-fight now commenced; every narrow lane was occupied by the enemy; street defences had to be forced, and the beleaguered garrison could render our party no aid; but the determination of our force overcame all opposition, and about 7 P. M., the 78th Highlanders, the Fusiliers, and a party of Seikhs entered the Residency, in which the garrison were besieged. General Neill was killed during the advance through the city, having been shot through the head by a bullet fired from a window above. On the 26th, and following days, every attempt was made to secure our wounded; but many of the dooly-bearers had absconded or were killed, and of those allotted to the Fusiliers ten doolies were thus abandoned. Prior to evacuating the city in November, about twenty dead bodies of European soldiers were found in the doolies belonging to the Force, and those of several bearers near them. The Fusiliers left Allum Bagh about 430 strong. On the advance to the Residency, two Officers and thirty-four men were killed or died of wounds, one Officer and thirty-four men being also wounded; seventy-one casualties in all.

The presence now in the garrison of upwards of 500 women and children, and about an equal number of sick and wounded, and the total

want of carriage, rendered it necessary to relinquish all idea of abandoning Lucknow to retire on Cawnpore as originally intended. Fortunately for the garrison, through the sagacity and wise precautionary measures of the late Sir Henry Lawrence, a large supply of provisions had been stored, and although no supplies were received from without, between the 30th June, the date on which the garrison retired to the residency, and the 18th November, the date of the arrival of the Commander-in-Chief's force, a period of nearly five months, the healthy portion of the garrison suffered no great privations from want of food, nor indeed until the 3rd of November, was it deemed necessary to place them on reduced rations. There was some deficiency, however, throughout in the supply of medical comforts for the sick. The arrival of Sir James Outram's force enabled the garrison to extend their positions, and in a short time buildings were occupied by them beyond their original entrenchments, thus greatly improving the sanitary state of the troops.

Lastly, bowel disorders became frequent, and the health of the garrison began to be materially affected. The gums in many cases exhibited sponginess, and the wounded did not recover. Dr. Arthur informed me that few instances of successful amputation of the extremities occurred. That many of the cases appeared to progress favorably at first; but after four or five days, the patient usually had a rigor, followed by febrile excitement and irritability of stomach; the flaps of the wound would then swell, assume a dark sloughy aspect, and the patient rapidly sink. Contusions and slight incised wounds were also prone to sloughy degeneration. The relieving force having only taken three days' supply of medicines with them, from Allum Bagh on the 25th September, and the greater part of this having been lost on the way in, the entire garrison became dependent on the small stock of stores found there. Latterly, much difficulty was experienced on this score, especially in the treatment of acute diseases, and also in the want of hospital clothing and bedding. Dr. Arthur was fortunate in securing for his men some tents (left behind by the rebels), which he had cut up and converted into bandages, bedding, &c.

On the 16th November, the Commander-in-Chief's force appeared before Lucknow, and on the 17th the garrison was relieved. On the night of the 18th, the chief portion of the sick and wounded were silently removed to Dilkoosha, two and half miles from the Residency in rear of His Excellency's camp; the following night the women and children were secured, the remainder of the wounded being removed to the same place on the night of the 20th. On the night of the 22nd. the entire garrison evacuated the Residency, and the force silently commenced its retrograde

march towards Cawnpore, and the enemy unaware of the arrangements made, continued to direct their fire on the buildings as usual for several hours thereafter.

The Fusiliers formed part of the force that remained in Camp at Allum Bagh, from the 25th November 1857 to 15th March 1858. During this time there were many severe encounters with the enemy, many casualties took place from wounds, and also several from fever and bowel disorders. But the communication with Cawnpore being now open, supplies were forwarded, and the more severe cases of sickness were transported thither for removal to the coast. On the 2nd March, the Commander-in-Chief's force re-appeared before Lucknow, and final operations commenced, in which the Fusiliers took part, which speedily terminated in securing full possession of the city. During the official year of 1857 and 1858, there were 291 deaths (Officers and men) in the Regiment, including the fifteen men massacred at Cawnpore. The Regiment remained on field service in Bengal until 17th January 1858, taking part in most of the final operations which have again restored repose to India. There were but few casualties latterly from gun-shot wounds; small pox continued, and remittent fevers with cerebral determination, and some cases of distinct typhoid fever. Bowel disorders and heat Apoplexy were the prevailing diseases during the period they were actively engaged. On the 14th February 1859, the Regiment embarked at Calcutta, and disembarked at Madras on the 22nd idem; from thence they proceeded by rail and transit to Bangalore, where they were at once moved into the barracks lately occupied by Her Majesty's 60th Rifles.

The following table exhibits the strength of the 1st Madras Fusiliers on its departure to Bengal and on its return to Madras, as well as the casualties which took place in the Regiment while on field service.

Strength of Regiment on embarkation.			...	915
Killed in action, Officers and men.		...	...	69
Died of wounds	do.	...	...	38
Do. of dysentery	do.	...	...	25
Do. of cholera	do.	..	...	92
Do. of *hepatitis*	do.	...	...	1
Do. of fevers	do.	...	...	14
Do. of other diseases	do.	...	...	33
Do. from *coup de soleil*	do.	...	...	17
Do. from drowning	do.	...	...	10
Do. from accident	do.	...	...	2

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Died on sick leave from wounds or disease contracted on service...	57	
Killed at Cawnpore	15	
Total deaths from 18th May 1857 to 22nd Feb. 1859 ...	363	
Total wounded, many of whom are disabled ...	195—558	
Returned to Madras, of the original effective men ...		357

At the period of my inspection, the present strength of the Regiment was 560, and the sick 48. Out of 200 women, 4 were in hospital, the prevailing diseases being fevers of the quotidian type, bowel disorders, and always a large proportion of venereal disease, but of a mild type, and chiefly gonorrhœa. The Surgeon prescribes turpentine in combination with balsam of copaiba, in these cases with manifest advantage. This Officer has favored me with the perusal of a treatise, shortly about to be submitted to the Director General, embodying his views on the treatment of acute dysentery, with reference to Circular, dated 2nd March 1859. The treatise is illustrated with cases exhibiting the therapeutic value of ipecacuanha when given in large doses, and it embodies the result of his extensive experience in its use. The paper appears to me to be replete with sound information and to establish the value of the remedy as superior to any other mode of treatment in this intractable and fatal disease. I submit that the interests of the public service would be advanced by making Dr. Arthur's practical views generally known to the service. This officer has already adopted measures to carry out the instructions conveyed in the Circular letter from the Quarter-Master General of the Army, No. 2,725, dated 17th November last, with reference to the formation of a day-room and a place of resort for the convalescing sick. Two doolies are placed at his disposal to take men out for air and exercise. As recommended on former occasions, a four-wheeled ambulance on springs should, I submit, be substituted for these.

Manufacture of Bread.

The bread supplied to European troops, not only at Bangalore but also at other Stations of the Army, is furnished by Contractors, who have very imperfect and ill-arranged Bakeries. At Bangalore there are constant complaints of sand and other impurities in the bread. I visited the Bakery in company with Surgeon Arthur of the Fusiliers; we entered by an open Court which was wet and offensive. An European soldier, a baker by trade, who has recently been placed at the Contractor's to superintend, informed us that the place swarmed with rats, bandicoots, and bugs. The flour is prepared in a roofed shed, open on one side, and from the roof, floor, and open sides of the building, sand

falls on the workman with every gust of wind. A number of women are seated on the floor clad in dirty rags, over which much of the flour passes; and altogether the place is most objectionable. The remedy for this would be either to make it a condition with the contracting party, that he provide quarters for the Bakery approved of by the Commissariat Department, or that the Commissariat Department itself provide a building and suitable establishment. SERIES II. SECTION I.

All the European Barracks in Cantonment being on slopes, their sewage, as well as that from the Sepoy lines, the scourings from the great bazars and from the Light Cavalry lines, flows into the Alsoor tank, occupying the centre of a valley contiguous. In short, all the filth and sewage of three-fourths of this large Station is emptied into this tank, which gives the sole supply of water to the entire population residing near it, as also to the soldiers who inhabit the Barracks over it, the wells within their premises giving no supply whatever in the dry weather. The Dragoon, Artillery and Light Cavalry Horses also are watered from this tank. There are wells certainly along its edge, but these wells cannot altogether remedy the evil I complain of, so long as the Alsoor tank is the depository of the filth of the greater part of this Station, and as the water it supplies, after such odious combinations, is used by the inhabitants for all purposes. A proper system of drainage should be carried from the barracks and through the great bazar beyond the area of Alsoor tank. Sewage of Bangalore

It is very desirable that a spring ambulance be attached to each European Hospital for the purpose of taking convalescents out for air and exercise upon the high ground adjacent to the Cantonment. Ambulance for the sick at Bangalore.

SECTION II.

French Rocks.

The position known as the French Rocks, six miles from Seringapatam, was made into a Military Station for a Regiment of Native Infantry, at the period when it was found necessary to abandon the latter place on account of its unhealthiness. It is placed 2,030 above the sea, and 300 higher than Seringapatam; occasional outbursts of fever afflict both Europeans and Natives. Here the temparature throughout the year is fully 8° higher than that of Bangalore. SECTION II. Left Wing 52nd Regiment N. I.

SERIES II. Section II.

The left Wing 52nd Regiment Native Infantry has been at the Station for ten months. There were only eight sick under treatment at the period of my visit, none of a serious character, nor has there been sickness to speak of since the Wing reached the station.

SECTION III.

Mysore.

Section III.

H. H. Rajah's Hospital.

The town of Mysore is the capital of the province and the residence of the Rajah. His Highness the Rajah of Mysore's Hospital is a useful establishment where the poor of both sexes are fed and receive medical aid. The Hospital was opened in 1840. The number of sick who received relief in the first year was 140. Now they usually average between 800 and 900. Fevers and their *sequelæ* are the most common diseases of the District.

Detachments 52d N. I. and H. M. 60th Rifles.

There are no sick in the Detachment of Native Infantry and the European Detachment temporarily stationed here, and no death has occurred since their arrival, nearly twelve months ago.

SECTION IV.

Hoonsoor.

Section IV.

Public Cattle Department.

The farm of Hoonsoor, the Head-Quarters of the public cattle Department is 2,970 feet above the level of the sea. Fever and chronic enlargement of the spleen are common amongst the inhabitants, and there are at times some terrible outbreaks of cholera. Ulcers are also very frequent in this District.

Here almost all the material for the Army, such as shoes, belts, and other personal appointments, are prepared. It is also an extensive breeding establishment for rearing public cattle. Including Blacksmiths, Carpenters, Chucklers and Cattle drivers, the average number of public followers is about 2,000. A public road runs within a few yards of the Hospital, the building being open on all sides. A wall or fence is

required to secure cleanliness and privacy. About the date of my first visit to Hoonsoor, 5,950 quart bottles of condemned Malabar fish oil, prepared as a medicine, were received at the establishment for the purpose of being used in the preparation of buff leather. SERIES II. SECTION IV.

I examined with much interest the manufacture of the extracts of hyoscyamus, taraxacum, &c., under Mr. Hilbers, the Medical Officer of the Station. This is, I believe, the only attempt made on a large scale within this Presidency to develop the resources of the country in the production of medicines of recognized efficiency and in extensive use. Mr. Hilbers has succeeded in obtaining an abundant supply of the drug, which is acknowledged by the Department generally, to be superior to any formerly received from Bengal, Bombay, or England.

To produce an extract of Henbane that will keep good in this climate, retaining the full virtue of the plant, requires unceasing care, for generation of heat and decomposition are very apt to supervene within one hour after the leaves are plucked. It becomes, therefore, necessary to convey the leaf in small quantities from the plant to the mortar, thence to the press and to the evaporating dishes. Independent of other considerations the whole process for the inspissation of the vegetable juices containing the active principle of the plant should not exceed 36 hours. Seventy pounds of the extract and the same quantity of the dry leaf for tinctures are prepared annually by Mr. Hilbers, at an average cost of one Rupee a maund, and now, here, in addition to the henbane plant, he is engaged in cultivating the conium, taraxacum, colocynth, jalap, scammony and other vegetable medicinal preparations, which are indigenous to this country, and which can be prepared so much better by solar heat than by artificial processes.

The ricinus communis plant grows in profusion around Hoonsoor. About 20,000 lbs. of the oil are annually consumed by the Army. With an efficient establishment, Mr. Hilbers considers that the whole of this, and other fixed oils, might be prepared at Hoonsoor ; but to carry out these measures, proper evaporating dishes and an Hydraulic Press must be added to his establishment.

For the effectual preparation of vegetable extracts, &c., it is necessary to have the aid of steam evaporating dishes : first, because the state of the weather does not always allow of the application of the solar heat ;

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and secondly, because even with the heat of the sun during the day, it is hurtful to the drug to delay its completion after its preparation has been once entered on.

SECTION V.

MERCARA.

SECTION V. Topography.

Mercara, the capital of the territory of Coorg, exceeds 4,500 feet in height. The Fort, in which the Officers composing the garrison are quartered, is placed on an isolated hill. The table-land around rises abruptly, and consists of a succession of lofty narrow ridges running parallel with each other, in a north-west or south-easterly direction, terminating in the plains of Mysore and the Wynaad.

The scenery of Coorg is bold and picturesque to a degree. In some parts the hills are gently rounded, alternating with sloping glades clothed with forest trees. In others, the hills are closer together, more abrupt and rocky, intersected with deep ravines and covered with low impenetrable jungle, while in others there is a succession of beautiful grassy downs and clumps of trees of magnificent growth, resembling park scenery in Europe. In almost all parts of the country vegetation is of the richest description, and its forests abound in game.

The highest points in Coorg are,

Tadiandamol	5,781	feet above the sea.
Poopagherry	5,682	do.
Kolar Betta	4,500	do.
Viraraujendrapett	3,399	do.
Nalkanadu	3,797	do.
Fraserpett	3,200	do.

The Cauvery river takes its rise near the top of a hill on the verge of the western ghauts, and another river, the Burrepollay, descends abruptly through a series of deep and rocky ravines forming in one place a cascade nearly 300 feet high. The geological formation of the country very much resembles that of the Neilgherries.

Population.

The population of Coorg has considerably increased, since the province passed under British rule in 1834. Before that period, wars, insurrections,

wholesale murders and arbitrary confiscations of property, depopulated the land, and the Coorgs were a miserably oppressed people; now they are treated as the lords of the country, and very deservedly receive every indulgence, for they are a fine, bold and loyal race.

The census in 1839 gave the number of Coorgs as...	17,096
And of other races..................................	63,341
Total...	80,437 while
that of 1856 exhibits of Coorgs	25,000
Other races..	1,10,600
Total...	1,35,600

Produce.

Hitherto the chief revenue of the country was derived from cardamums, arrack, and rice; but coffee now affords another large source of revenue; already many thousand acres of forest land have been placed under the cultivation of this shrub, which grows with greater rapidity and more luxuriance here than in any other district in India; plants of two years' growth in Coorg being equal to those of three years and upwards in any other locality. The Coorg proper never performs any menial labours. All his agricultural and domestic concerns are carried on by hereditary bondsmen.

Kuddings.

There are no cairns, such as are found on the Neilgherries, on these mountains, but the kuddings which comprise solid walls of earth many feet in height and breadth, having a deep and in some places an almost impassable pass on one side, are evidently works of great antiquity. These run along the summits of the lofty ridges for many miles parallel with each other, enclosing a vast space and meeting at times at one extremity where there is a wicket wide enough only for the passage of one horseman at a time. The present inhabitants have no knowledge of the date or reason why these vast structures were formed, and it is evident from the size of the trees which are now found on their banks that they are works of a very remote date. The natural conclusion is that they were raised for purposes of defence at a time when the country was in the possession of several independent Rajahs.

Climate.

None of the ranges of hills in Coorg appear to possess superior advantages to Mercara in a sanitary point of view. It is fully under

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SECTION V.

the influence of the south-west monsoon, and the rains with little interruption continue from the beginning of May until the end of October. During the remaining six months of the year, the weather is very pleasant. The average fall of rain is 160 inches per annum. Yet there are few swamps, or accumulations of water on the surface ; for the rain as it falls rapidly passes into the valleys which intersect each hill, and from thence into the rivers.

The climate of Mercara resembles very much that of Bangalore, but the temperature is more equable. The maximum marked by the thermometer in the shade is 79°, the minimum 52°, and the mean 66°. The advantage of being able to take exercise in the open air at all hours during the greater part of the year, and the coolness of the night, gives to both European adults and their children a particularly healthy appearance, and the natives of the country are a robust and an enduring people. Notwithstanding that the atmosphere thoroughout the year is loaded with moisture, bronchitic and rheumatic affections are not frequent. But, as at Bangalore, the climate is unsuited where there is a disposition to visceral congestion. Fevers are common amongst the Natives, occasioned usually by exposure and imperfect clothing ; wounds and ulcers are apt to become indolent.

Hospital 52nd Regt. N. I.

The Hospital is about thirty yards from the south curtain of the Fort, with which it communicates by a sally port. It is a long, tiled, well-ventilated building, consisting of a Native and European ward with fire places, besides private apartments, and every convenience which can be desired. Until recently the Military force at the Station consisted of a Native Regiment and a Detachment of European Artillery; now a Native corps only garrisons the place. The men are very healthy.

Civil Dispensary and Jail.

In the Civil Dispensary at Mercara during the year ending 30th September last, 776 sick have received relief; the majority of the admissions being from intermittent fever. But these cases are usually amenable to treatment. Vaccination appears to be effectually kept up in Coorg. During the past year, 2,293 infants have been vaccinated, of whom 2,125 have been successful. The average number of prisoners in the Jail at Mercara is 40. They have a robust appearance ; their ailments are usually of a slight nature, and their quarters, if newly boarded and the ventilation above somewhat improved, would be very tolerable.

SECTION VI.

Hurryhur.

This Cantonment, which is a frontier Station in the Province of Mysore, is situated in a wide plain, about 1,500 yards from the right bank of the Tungubuddra river at an elevation of about 1,900 feet above the sea, and distant about 90 miles in a direct line from the nearest point of the Malabar coast. It is fully under the influence of the sea-breeze, and shares in both south-west and north-east monsoon, the climate is, therefore, pleasantly cool the greater part of the year, the hot weather being confined to May and June, and except when occasional severe visitations of cholera occur, the Cantonment is generally healthy.

16th Regt. N. I.

The 16th Regiment marched on the 20th December last from Mangalore. Five days afterwards three cases of cholera appeared, of which, one died ; on the sixth day there were four cases ; on the seventh, there were twenty-one admissions and four deaths. On the 8th, eight admissions and two deaths occurred. On the 9th, there were nine admissions and four deaths ; from this date to the 21st January, the disease increased. On this day, it attained its maximum, viz., eighteen admissions and ten deaths. It then gradually subsided, and disappeared altogether on the 16th February. The total admissions were 192, and the total deaths 134. There was no cholera at Hurryhur when the Regiment arrived there, and it does not appear that proper precautions were enforced to arrest the extension of the malady on the arrival of the 16th Regiment at the Station. The Quarter Master of the Regiment was sent on to Hurryhur with intimation of the out-break of the disease in the 16th Regiment, and a place some distance from Cantonment was selected by him to encamp on : yet the men of tho 35th Regiment quartered there, were permitted to communicate with the Camp and actually took with them on their march to Bellary upwards of 150 of the bandies which had accompanied the 16th Regiment from the coast. The fatal results of the out-break of cholera in the 35th Regiment on its march are remarked on elsewhere.

A second out-break of the disease took place in June, the first case appearing on the 15th of that month. The epidemic continued with almost daily admissions and deaths up to the 7th September, during which period there were eighty-one admissions, and forty-one deaths in the Regiment ; and in the population around seventy-four cases were treated,

SERIES II.
SECTION VI.

of which twenty-nine died. The ratio of sick to strength in the Regiment for the twelve months prior to the period of my inspection has been 55·55 per cent. The ratio of deaths to sick 7·24 per cent., and that of deaths to strength 4·02 per cent., out of an average strength of 1,044. On the morning of my inspection I found 26 sick in Hospital.

Ulcers, and indeed all abraded surfaces, in Hospital often assume an colored sloughing appearance; the after treatment of leech bites and blisters is usually longer than the original affection that called for their application. This is due entirely to local causes; a high wall encircles the Hospital a few feet apart on three sides in the direction of the prevailing sea-breeze, and a filthy privy without roof ventilation occupies a space in this wall opposite the centre of the building;—the consequence is that in defiance of every precaution, a fœcal atmosphere permeates the wards;—there is long grass in the Hospital court, which gives cover to filth, and the original space around it has been encroached on by native houses. A class of followers who attach themselves to each Regiment, as it reaches the Station and remain on its departure, occupy a position adjoining the mens' lines and in the Regimental bazaar. It was here the last out-break of cholera commenced. It is a filthy spot, and it would be conducive to the hygiene of the Cantoment, if the Officer Commanding the Station were empowered to remove these houses and effectually drain the locality.

SECTION VII.

SHEMOGA.

SECTION VII.

In passing through Shemoga, under the Mysore Government, the Medical Officer invited me to pay a visit to the Departments under him. These consist of a separate Hospital for Brahmins and a Soodra Hospital for all-castes except Brahmins. The average number of sick in Hospital is thirty, and the daily average number of out-patients attending the Dispensary is sixty-five. The Hospital is a commodious building, and it is resorted to by parties residing at great distances. On occasions when Superintendents proceed on Jummabundy into the district, the Surgeon accompanies them, in order personally to examine the work performed by Vaccinators during the year, as well as to extend its benefits. I think some such system might be introduced into our Col-

Vaccination.

SERIES II. SECTION VII.

lectorates, where the imperfect performance of vaccination is notorious, although the returns indicate a prosperous state of matters; for, although the Medical Officer by his signature, testifies (as it were) to the correctness of the Vaccination returns, he really knows little or nothing about them.

The following annual return should be compiled to replace the quarterly ones now in use.

ANNUAL VACCINATION STATISTICS.

Taluqs.	Population of each in 1859.	Births in the year ending ——.	Deaths during the first year of life.	No. of children alive at the end of 12 months.	No. of successful vaccinations during first year of life.	No. of successful vaccinations after first year of life.	Total No. of successful vaccinations for the year ending ——.	Total No. of unsuccessful vaccinations for the year ending ——.
...	...	...	..	...	...	...	...	...

Babaooden Hills.

Dr. Houston accompanied me to the Bababooden hills, situated about 40 miles to the west of Shemoga, and about double that distance north-west of Bangalore. The highest elevation of the range is 5,780 feet above the sea, and at 5,400 feet considerable space of building land is available. There is a good water supply on the summit, and the climate is hardly inferior to that of the Neilgherries. The surface is undulating and somewhat bare of timber. European fruit trees and vegetables attain great perfection, and the coffee shrub flourishes on the slopes of the mountain. The scenery around is of romantic beauty. The District civil authorities have houses on the summit which are occupied during the hot season.

SECTION VIII.

SIRCY, NORTH CANARA.

SECTION VIII.

Detachment 51st Regt. Native Infantry.

This Station is the Head Quarters of the Civil Department in North Canara. The strength of the Detachment present is 101 men, of whom I found three in hospital. The prevailing diseases are quotidian fevers. Remittent fevers are rare; and the climate is considered healthy. The range

SERIES II. SECTION VIII.

of the thermometer at the period of my visit was from 75 to 85, the elevation above the sea is about 2,000 feet and it is the highest point in North Canara. A Company of H. M. 66th Regiment were lately resident here for about 12 months. There were no deaths in the Detachment, and only two cases of severe fever took place. The climate is peculiarly agreeable to the feelings, and the temperature throughout the year is said to be very equable.

Jail.

There were only 16 prisoners in the Jail, and they had all a robust healthy appearance.

Field Force.

From Sirey I proceeded to inspect the chief Detachments occupying field posts throughout North Canara. The scenery throughout the country is very picturesque, presenting at times for miles a succession of well-wooded slopes with open glades and park-like views on the summits, and rich well watered valleys with luxuriant crops of rice, sugar-cane, and arecanut; the neat and comfortable looking abodes of the holders of these lands, being usually placed in an elevated and healthful spot. At other times you pass by a narrow path through miles and miles of dense bamboo jungle, or open forest trees, the general elevation above the sea varying from 2,000 feet downwards.

Jugglepett, the Head Quarter Station of the force, is about 60 miles from Sirey. Here a Captain, two subalterns, and the Medical Officer reside. At the smaller Stations of Yellapore, Kulghee, Amoda, Jamga, Patchy Oonchee, &c., there being no Medical subordinate in charge, the sick are sent on to Jugglepett or to Sirey. At Bamenhilly, Comerawady and Timny the Detachment is under charge of an European Officer, and attached to each is a Medical subordinate. Here suitable buildings are prepared for the reception of sick; Timny appears to be the most sickly spot and Comerawady the healthiest. This latter place has been well selected, and the country is more open than in any of the other spots.

Routine system for the cure of Fever reproved.

Fever of a quotidian type is the great and prevailing disease. I found that the routine system of practice pursued in our ephemeral fevers of the plains, viz., the administration of an emetic and purgative was in use every where above these ghauts, on the first admission of the patient into Hospital. I cannot too strongly reprobate this system of practice. Under any circumstances it is, I think, a most doubtful proceeding. But here, where the blood becomes poisoned by miasma, if we reduce the system by means of emetics and drastic purgatives, instead of eliminating the poison, it gets a stronger hold on the system, and the cure of the disease is rendered more difficult, if not altogether placed beyond our reach. In these fevers

of North Canara there are but few complications at first; yet I found parties in hospital for days without receiving any quinine, or the medicine given only in small doses and at long intervals; the result was extreme lassitude and prostration of strength, languid circulation, and œdematous limbs. Were the system judiciously charged with the febrifuge soon after the appearance of febrile symptoms, the bowels gently acted on by alterative aperients, and the miasmatic poison at the same time eliminated from the system by the free use of diuretics and diffusible stimuli, the duration of these attacks of fever would be lessened, there would be less risk of relapse, and the results altogether would be more satisfactory. SERIES II. SECTION VIII.

Hullyaul is the head quarters of the Canara Police Corps; present strength 169. The men are stationed within a ruined fort overgrown with rank vegetation, and nearly surrounded with stagnant water and other sources of malaria. I found them suffering a good deal from fever. Captain Drever, Commanding the Corps, and myself selected an open and healthy locality outside the fort, to which spot he proposed to remove his men.

Population.

The population of North Canara is rapidly increasing, and the town of Sircy is daily rising into importance; the Sub-Collector of Canara resides here; it is the head-quarters of the Force sent to protect the country above the ghauts, and there are always several European Officers at the station. It is the great emporium for the trade of the country and thousands of bandies, bearing cotton and other produce from the southern Maharatta country, annually pass through the Western Coast for export. Accidents are not of uncommon occurrence, and the applications for medical aid are constant. It would be attended with much good if a Medical Officer, amply provided with surgical instruments and medicines, could be permanently located here.

SECTION IX.

SEDASHAGUR.

SECTION IX.

Detachment 8th Regt. N. I.

The proper strength of the Detachment stationed here is one complete Company, but the men are now broken up on Detachment duty. The Medical Subordinate in charge has been resident at Sedashagur for about six years. He tells me that he has not known a case of cholera to occur at this place. The hospital is a good building adapted for six cots. Sick from the field Detachments in North Canara are sent here for embarkation to Mangalore and elsewhere, to join their respective head-

SERIES II. SECTION IX.

quarters. There are many elevated and favorable building spots around. A spur of high land runs out into the sea for upwards of a mile, on which the village of Beitcal is placed, which gives its name to a noble, nearly land-locked bay, having a circumference of some ten miles of deep and good anchorage for shipping; the water in which has seldom a ripple on its surface.

Objects of interest around.

There are many objects of topographical interest, both of nature and art, to be found below and on the line of ghauts on this coast. I will enumerate the chief of these.

The great natural objects of interest are the Garsapah falls, the Lushington falls, and the Yama rocks.

The *Garsapah falls* are formed by the escape of the Sheranutty river from the table-land above to the low country below the ghauts, at the hamlet of Kudkenny. Here the river at the edge of the precipice divides, and forms four separate water-falls, which have a perpendicular descent of nearly 900 feet into a pool below of upwards of 300 feet in depth. All of these falls have distinct and grand characteristic features, which give them separate and very appropriate denominations, viz., the "Dame Blanche," the "Rocket," the "Roarer," and the "Great fall". The latter has a peculiarly grand effect, as it bounds over a shelving rock of some twenty feet, and passes down to the deep dark gulf below without anything to break or obstruct its descent. The other three have also very striking beauties in themselves, and the bold scenery around is very sublime. It is very evident that the stream has in the course of years gradually worked its passage deep into the mountain; the rocks around assume every fantastic shape, and the eye can trace on the precipices adjoining the successive slips that have taken place, and there is no difficulty in perceiving that this slow process of attrition still goes on.

The Lushington falls are twenty-three miles from the Garsapah on the road to Sircy. They are formed by the passage of the Tiddrery river over the ghaut close to the village of Oonchelly. Here the stream has cut a deep trough into the solid rock, down which it rushes in a cataract for some 400 or 500 feet, it then spreads out, and falls over a precipice, in one column, to a depth of 525 feet. The fall is in the midst of a dense forest and high hills topped with grass; the scenery around cannot be surpassed.

The *Yama* rocks are about twenty miles from the Lushington falls; to reach them, the path leads through a virgin forest, a distance of six miles from the village of Kutgul. Suddenly, on emerging from the dark

forest, and ascending some rising ground, these peculiar rocks are observed to rise up perpendicularly upwards of one hundred feet above the lofty teak and other trees around. There are no other rocks in the neighbourhood of these, and at the distance they have the appearance of basaltic columns, but on nearer approach they are found to be in layers. On the summits they terminate in peaks, some of them being perforated and needle-shaped; and so regular is the formation of the whole that it has the appearance of the gable end of a Cathedral blackened from age and exposure to the elements. The presence of these solitary rocks in the midst of the dense forest is very singular; no stream of water runs near them, and it is hard to conjecture how they happen to assume their present fantastic shapes. SERIES II. SECTION IX.

The chief works of ancient art are the sculptures and fine statues in black marble, found in the now ruined and deserted city of Garsapah; the erect Egyptian looking stone figure of a man forty-five feet in height, placed on the top of a bare black rock without any coating of earth around, at the village of Karkul; the temples at Muda Beddari he ruined city and temples at Hallibede; and the statues, temples, and gigantic image at Chenroypatam; all of which belong to the era when the Jains or Buddhists held sway in the country, a considerable number of whom are still resident in those parts.

SECTION X.

HONORE.

SECTION X. The town of Honore on the Western Coast contains about 12,000 inhabitants. The Session Judge and Sub-Collector resides here. The new Jail, in course of erection, will accommodate some 200 prisoners. As the trade from North Canara, and agriculture from that country increases, so will Honore rise into importance. There is a very good road down the ghaut; and from thence to the sea, a distance of about eighteen miles, there is good and safe water communication on the Sheranutty or Garsapah river. The station is very healthy, and cholera has never been known to visit it. The average daily sick treated as out-patients at the Dispensary during the past year has been eighty-one, and those receiving treatment in Hospital eight; the prevailing diseases being bowel disorders, rheumatic and cutaneous affections. It is in contemplation to give up the present Jail for a Dispensary, so soon as the new Jail, now under construction, is completed; Civil Dispensary.

SERIES II. SECTION X.

and this building, when provided with a few alterations to improve its ventilation, will answer admirably for the purpose.

Jail.

The average sick in the Jail at this place is close on six per cent. per annum. The prisoners look robust and well, and they are employed partly in road and other works outside, and partly in in-door occupations. The new Jail, in part only occupied, is placed on an elevatedand very airy spot. But the plan of the building is most faulty, having long wards, some seven feet in breadth placed *dos a dos*, with free ingress for fresh air through barred openings in front, and a free transmission of foul air from ward to ward, but no egress above. That filthy and obsolete system of providing each prisoner with an earthen chatty to receive his excretions during the night is about to be introduced here. I beg to urge the introduction of means for securing roof ventilation into each ward, and also the construction of closed privies at each end of the wards, capable, from the elevated site of the plateau on which this jail is placed, of being introduced here with much ease.

Detachment 8th Regiment Native infantry.

In the Detachment Hospital I found but two sick out of a strength of 101. Two deaths have taken place during the past year from dysentery; but the men have been upon the whole very healthy. Medicines, &c., for the Detachment are provided from the Jail, and the Dresser from there attends upon them in a comfortable detached building close to the men's lines.

SERIES No. 3.

SOUTHERN DIVISION.

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SERIES No. III.

SOUTHERN DIVISION.

SECTION I.

Trichinopoly.

This Cantonment forms the Head Quarters of the Southern Division, distant about 207 miles south-west of Madras. It is placed on an extensive plain, interspersed with numerous insulated masses of granite rock, which rise in irregular shapes to a great height or stand in detached tabular masses.

SERIES III. Section I. Trichinopoly. Garrison Hospital, and Medical Store Department.

Since the water from the river Cauvery, which runs close to the Cantonment, has been diverted from its course, for irrigating purposes, vegetation covers the face of the country where formerly all was arid and barren, and there is no longer that dry, close, sultry atmosphere and intense radiation of heat, which were the characteristics of the station of Trichinopoly. The climate as compared with other stations of the Army is very hot, but considered salubrious, and it becomes more so as cultivation extends.

The Fort, now a ruin, is situated in close proximity to "the rock of Trichinopoly," which is a naked mass of granite rising to a height of about 500 feet above the level of the plain. That part of the native town within the Fort, has a population of upwards of 30,000; while beyond it, the town covers an area of many miles and contains 100,000 inhabitants. Formerly the huts were closely huddled together, the streets were narrow, and the drainage bad. Of late years vast improvements have been effected; ventilation has been established by forming new streets, which are lighted at night, and other sanitary reforms have been introduced, which tend greatly to the health and comfort of the inhabitants.

The Bomb-proof buildings occupied as a Garrison Hospital and Store-rooms are unsuited for sick, from their position and construction, being too close to the rock, too much surrounded with buildings, at too great a distance from Cantonment, and being without ventilation. The sick admitted into this Hospital consist of Details from Regiments and Departments and public followers attached to the garrison. In the Store-room the medicines were well classified. The fish liver oil and the sulphuric acid supplied are reported to be unsound and to a great extent useless; the former on account of its rancidity and offensive

SERIES III. Section I.

odour; and the latter from its impurity, its color being as dark as ink. It was brought to my notice that great waste takes place from the small quantity of phials and gallipots supplied, which renders it necessary to issue liquid drugs (in ounces) in ordinary quart or pint bottles, with corks, and extracts, &c., in parcels.

Hospital, Left Wing 2nd E.L.I., and A Company 2nd Battn Europ. Arty. Barracks for European troops.

The Hospital for the sick of the European Regiment and Artillery stationed at Trichinopoly, is a commodious and lofty well ventilated building, enclosed by a wall 10 feet high. It is divided into six wards, in which 100 beds can be placed. There is a female ward in the centre court; this is objectionable, being too close to the men. As the latter proceed to, and return from the privies, they pass close to its door. All the wards are provided with punkahs, and there is an air of comfort throughout the hospital, which is exceedingly neat and clean. But a lavatory and bath-room is urgently required, constructed in a superior style to the present, where each man washes in the water which has been used by his neighbour. There is now but one bath-room for men, women and children, who number in all upwards of 800 at the station. The sick in the Wing 2nd European Light Infantry numbered twenty-four, which is about the average; the strength being close on 400; and there were nine Artillerymen in hospital. Vaccination is kept up. The grounds around the hospital are clean and well drained, and I was well satisfied with all I saw.

The Medical Officer in charge represented to me that nearly the entire time of the Senior Assistant Apothecary was taken up with making out returns and keeping up the records; this was a cause of complaint in every station I visited; I, therefore, purpose to enter on the subject of Returns under a separate head.

Barracks for European Troops at Trichinopoly. Ventilations of Hospitals and Barracks, and causes which influence disease in India.

The great defect to be found in the present barracks for the European Regiment stationed at Trichinopoly, is want of space and want of air. That for the Artillery is a spacious, lofty, and well-ventilated building, in an airy and well raised situation; it has plunge bath and other conveniences. There is an abundant supply of good water, and from its position sufficient drainage is secured.

Temporary accommodation is now being erected for the European Regiment shortly expected to arrive. But as it is in contemplation to build new Barracks for the English Regiment which will be stationed here, I will make a few general observations on this subject, and also on the causes which influence disease amongst our countrymen in the Military service in India. By the following table, which exhibits the

strength, sickness and mortality in each division of the Madras Army for a period of years contrasted with 1856-57, it will be observed that the per centage of SERIES III. SECTION I.

	Treated to strength for 14 years ending 1855	was	163·9, and	for 1856-57,	153·4
Do.	of deaths to strength	do.	3·3	do.	2 ·8
Do.	of deaths, excluding cholera,	do.	2·6	do.	2·08
Do.	of deaths to treated	do.	2·06	do.	1 ·8

[*See statement next page.*]

SERIES III.
SECTION 1.

EUROPEAN TROOPS.

Table exhibiting the strength, sickness, and mortality in each Division of the Madras Army for a series of years contrasted with 1856-57.

DISEASES.	From 1842 to 1855-56.								For 1856-57.							
					Per centage of								Per centage of			
	Strength.	Treated.	Died.	Death from Cholera.	Treated to strength.	Deaths to strength.	Deaths to strength excluding Cholera.	Deaths to treated.	Strength.	Treated.	Died.	Deaths from Cholera.	Treated to strength.	Deaths to strength.	Deaths to strength excluding Cholera.	Deaths to treated.
Presidency	15,008	23,970	416	77	153·7	2.7	2·2	1·8	772	1,293	20	..	167·4	2·5	2·5	1·5
Centre Division	20,286¼	29,895	862	185	147·3	4·2	3·3	2·8	504	966	20	2	191·6	3·9	3·5	2·07
Southern do, ...	13,601¾	24,709	407	106	188·9	2·9	2·2	1·6	614	822	17	2	133·8	2·7	2·4	2·06
Mysore do.	24,109½	33,489	516	109	138·07	2·1	1·6	1·5	1,477	1,865	65	48	126·2	4·4	1·1	3·4
Malabar and Canara	13,891½	21,480	316	15	154·6	2·2	2·1	1·4	550	757	10	..	137·6	1·8	1·8	1·3
Ceded Districts	10,285½	17,831	358	201	173·3	3·4	1·5	2·007	115	126	1	..	109·5	0·8	0·8	0·7
Hyderabad Subsidiary Force	18,859½	34,405	672	55	182·4	3·5	3·2	1·9	1,125	1,929	16	1	170·5	1·4	1·3	0·8
Nagpore Force	8,297¾	16,459	309	35	193·3	3·7	3·3	1·8	239	611	7	2	255·6	2·9	2·09	1·1
Northern Division (to 1851) .. .	1,126¼	901	58	...	80·01	5·1	5·1	6·4	..	..	..	...	...	..	...	..
Southern Mahratta Division (to 1846)	1,132	2,609	52	12	230·4	4·5	3·5	1·9	...	.	...	..	..	...	..	..
Saugor (from 1846)	1,524	3,108	38	7	209·3	2·4	2·03	1·2	165	552	8	1	334·5	4·8	4·2	1·4
Tenasserim Provinces	5,194⅓	8,466	157	26	162·9	3·02	2·5	1·8	73	138	2	..	189·04	2·7	2·7	1·4
Straits.....	808	893	16	...	110·5	1·1	1·9	1·7	43	51	2	...	118·6	4·6	4·6	3·9
Aden (from 1844 to 1854-55).. ..	2,248	3,530	86	19	157·02	2·8	2·9	2·4	...	...	..	..	..	..	.	..
China (from 1842 to 1845)	539	1,846	27	1	342·4	5·009	4·8	1·4	...	..	...	...	...	..	..	..
Labuan (from June 1852 to 1855-56)	47⅓	123	5	..	261·7	10·6	10·6	4·06	..	..	..	...	..	..	..	..
Burmah (from 1852)	7,273⅓	13,728	520	145	188·7	7·1	5·1	3·7	1,836	2,416	42	2	131·5	2·2	2·1	1·7
General Hospital (deaths only) ...	...	..	63	7	..	...	..	..	..	..	5	...	..	...	..	..
Total.....	1,44,238¼	2,36,342	4,878	1,000	163·9	3·3	2·6	2·06	7,513	11,526	215	58	153·4	2·8	2·08	1·8

When we remember that in the period embraced in the first of these cycles, the casualties of war are also included, the fact remains apparent, that hygienic reform has not yet effected much in this Presidency. For while the mortality amongst Officers is now scarcely higher than in the larger towns in England, that of the men continues nearly as high as before.

The recent report of the Royal Commission in England shows, beyond dispute, that a large proportion of the mortality amongst British soldiers, arises from causes which are remediable, and the startling fact has been brought out that "if the Army at home were as healthy as "the population from which it is drawn, soldiers would die at one-half "the rate at which they die now," and that "at present the Army stands "almost at the head of unhealthy occupations in the United Kingdom." In calculating these results, the Commissioners took a period of fifteen years prior to the rupture with Russia.

The causes which influence health and disease in England, operate with still greater force in India, and there is ample room for improvement in this respect, to stay the waste of life that goes on year after year in the Army, from the neglect of the most obvious requirements for the maintenance of health.

In the construction of barracks, our first care should be to guard that nothing is being done repugnant to nature's laws. While great epidemics rage, we are apt to place too great faith in disinfectants and prefer chloride of lime to plenty of pure fresh air, the great prophylactic remedy against all diseases, where men are massed together, in health or sickness.

In illustration of this, I will adduce one of the most recent instances. Dr. Rigby, lately the Senior Physician of the General Lying-in-Hospital at Lambeth, in consequence of the dreadful mortality arising from repeated out-breaks of puerperal fever, induced the Committee to adopt Dr. Reid's system of ventilation. For seven years the new system was worked, and the mortality, which had ranged from seventy-six to ninety per thousand, fell to less than five per thousand. Disregarding these facts, the Committee determined to recur to the old system, and the mortality rose again to twenty-five per thousand. The following table shows how the mortality varied from year to year.

SERIES III. Section I.

Statistics of the mortality of Women in child-bed at the General Lying-in-Hospital, from 1837 *to* 1856, *from the Register Book of the Head Midwife.*

Year.	Delivered.	Died.		Average of deaths per 1,000 deliveries.
1837	197	3	1837 to 1842, 802 women were delivered, of whom 61 died......	From 1st January 1837, to the closing of the Hospital, August 1841, 76·05.
1838	76	20	April 1842 to April 1843, 209 women delivered, 19 died.	
1839	197	7		
1840	213	15		
1841	119	16	Hospital closed August 1841.....	
1842	154	9	Hospital re-opened April 1842, with Dr. Reid's ventilation, but the valves kept shut until April 1843..................................	From April 1842 to April 1843, while the valves were closed...... 90·90
1843	193	10	The 10 deaths were in the first three months......................	
1844	179	0		From April 1843, when the ventilation was first properly worked to April 1850, when it was stopped. ... 4·81
1845	187	1	This was rupture of the uterus ...	
1846	221	0	April 1843 to April 1850, 1,661 women delivered, 8 died.........	
1847	274	2		
1848	320	1		
1849	278	4		
1850	221	0	Ventilation discontinued April 1850......	From April 1850 (inclusive) when the ventilation was stopped, to May 1855, when it was renewed. .... 25·90
1851	192	7	April 1850 to May 1855, 1,158 women delivered, 30 died...... .	
1852	216	3		
1853	234	7		
1854	272	10		
1855	291	14	Ventilation renewed May 1855; of these deaths 10 were from puerperal fever..........	
1856	300	7		

Now the practical point to be borne in mind, which is fully established by the table above quoted, is that with seven years' ventilation we have a death rate extraordinarily low, while the change from ventilation

to non-ventilation was followed in a few months by a shocking increase of mortality. And here a fact of great importance has to be observed: the effect of ventilation or non-ventilation is not evident until some weeks after a change of system. The wards polluted by miasmata, remain pestilential for several weeks after the purifying influence of ventilation is brought to bear upon them, and pure wards are not contaminated at once, but must become saturated as it were, with emanations from the bodies of the sick before the patients begin to suffer.

To take another illustration nearer home: Ophthalmia had for years established itself as an endemic disease in the Military Male Asylum of Madras, so long as the children were crowded with most inadequate space and imperfect ventilation. Of late some improvements have been carried out at the suggestion of Dr. Maclean, the Medical Officer in charge, and at this moment there is not a case of ophthalmia in the institution.

The air is composed of two gases, oxygen and azote; a portion of the vapours of water, and a portion of carbonic acid. This ethereal compound occupies a space around our earth of between forty-five and fifty miles in a diverging radius from the surface, and is only changed in its chemical properties, by emanations from the earth or sea. A man consumes about 32 inches of oxygen in a minute; replacing it, with the same amount of carbonic acid gas from the lungs, thereby rendering useless 800 inches of common air. The expired air consists of vapour, azote and carbonic acid; when ejected, as it is lighter than common air, it rises with velocity and is entirely removed from us before it becomes diffused in the atmosphere. We may infer from this circumstance that nature has ordered us to inhale pure air, as the *vis inertia* of our existence.

We see then the importance of so regulating the flow of fresh air from below, that it be not liable to mix with the ascending portion of expired air, which should find free egress in the roof.

Doctor Arnot, in his evidence before the Select Committee, on the best means of ventilating the House of Commons, stated, that there can be no perfect system of ventilation which does not possess:—

1st.—The means of moving through the building steadily, the definite quantity of pure air known to be required by the lungs, and what has become deteriorated by contact with the surface, which he calculates at four cubic feet per minute to each individual.

2nd. The means of discharging the vitiated air from the room.

The returns exhibiting the mortality of troops in India have been arranged into three classes, abstinent, temperate and intemperate, with their

SERIES III. SECTION I.

respective mortalities as follows:—Abstinent, 11 in 1,000; temperate, 23 in 1,000; intemperate, 44 in the 1,000.

If drunkenness, therefore, can be diminished; if we can secure cleanliness of person, of camps and of quarters; if we promote amusements and healthful occupations, mental as well as physical; if we adopt suitable clothing, sites and construction of barracks, and attend to cooking and to food, we secure the principal safe-guards for averting both epidemic and endemic diseases of a serious nature.

There is still one subject to which I would briefly advert. Throughout the very able report of the Royal Commissioners above quoted, the feeling is apparent that it is the duty of the Surgeon to point out evils and suggest remedies. To the Medical Department of the Army is entrusted the health and life of the soldier, whose health is undermined, and whose life is lost by influences which might be removed or prevented. The Surgeon is therefore to blame if he fails to point out the means at hand for averting this result. But the Commissioners have taken especial care to show that the Medical Officers are not the culpable parties, that the blame of unhealthy encampments, bad barracks, monotonous food, unsuitable clothing, and other causes injuriously affecting the health of troops, should not be laid on the Medical Department.

The Principal Inspector General will, I am sure, agree with me, that the sentiments of the Commissioners on this all-important subject are applicable to this country, as well as to Great Britain and her Colonies. He will appreciate the difficulties under which the Medical Department labors from a total want of power, and, I trust, he will earnestly urge on this Government, the necessity of investing them with authority to carry out sanitary measures; that Commanding Officers should be compelled by regulation to consult the Medical Officers on every sanitary question; and that they should be held responsible if they do not adopt the recommendations of their Medical Officers on such subjects.

There is nothing the public at large understand less about, or treat as a matter of such little importance, as ventilation; the anticipated permanent increase to an English Army in India, and the great importance of this and the other questions under review, must be my apology for the length to which my observations have extended.

Hospital furniture, clothing and utensils. Beds and bedding.

The sooner wooden beds are banished from our hospitals the better; they are objectionable in every way; they are clumsy, take up room, are difficult to keep clean, and worse than all, harbour vermin; this last is a very serious evil. To expose a man unnecessarily to be preyed upon

by unclean insects, is not justifiable; but to add to the sufferings of a sick man in this way is cruel in the extreme. I know no sight more piteous, than that of a patient suffering under a fractured limb, disturbed, fevered, and tormented during a long night by voracious insects crawling about the injured extremity. Every wooden cot should be destroyed and light iron frames substituted similar to those furnished to the hospital of the 1st Cavalry, but with tape below instead of iron plates.

There is also great room for improvement in the bedding. In the hospital of the 1st King's Dragoon Guards, I found that coir mattresses were being in part substituted for straw. Coir mattresses were shown me that had been in use three years and were still as good as new. If a coir mattress happens to become soiled it is opened out, teased, washed with chloride of lime, and returned into its washed coverlet as good as ever. Whereas, when straw is used it is uncomfortable for the patient from the first; it is speedily broken up into chaff, and has to be renewed twice in each month. There is no comparison between the comfort, and in the end, inexpensiveness of coir over the straw as permanent bedding for European hospitals. The dirzee and other servants attached to the hospital do all that is needful in the one case, when once the material has been supplied; while in the other, indents are necessary on the Commissariat Department, and delays, inconvenient to the sick, are not a unfrequent result. The quilts afford a most imperfect protection to the sick soldier from the damp and cold, particularly in such stations as Bangalore, Cannanore, Nagpore, &c. The quilts are not quilted at all, they consist merely of a piece of blue and white cloth stitched together. The towelling and sheeting is of a very inferior description, open and gauze-like in the mesh; a more enduring and substantial cloth would be the cheapest in the end. Again, according to the present regulations, a sick private is not allowed sheets on his bed, while this indulgence, or rather necessary, is conceded to the Non-Commissioned Officer. This, I think is objectionable; all should fare alike in the wards of the Regimental hospital; certainly, it should be at the discretion of the Medical Officer to allow sheets to the private soldier whenever he may deem it necessary to do so. While on the subject of hospital clothing, I may state that the night gowns in use are too small and scanty for the men, and that they are too open in front, especially for the hospitals on elevated ranges and in cold latitudes.

Utensils.

The present night chairs are very objectionable. In a large Military hospital, during an epidemic of dysentery, it is the present practice to

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keep in an open verandah the secretions from the bowels of patients laboring under this disease for the inspection of the Medical attendant, in order that he may see what progress the case is making. The night pans are generally ranged in a back verandah; and towards morning, particularly if the wind happens to set from that quarter, a privy atmosphere of the most pestilential kind pervades the whole place. I have long been assured that evil consequences follow. I have often seen fever patients and others exposed to these emanations, smitten with the prevailing epidemic in its most putrid form; and my opinion has been strengthened, by the researches into this question by Dr. Budd, who has shown how much some of the most deadly forms of disease are propagated in this way. It would be easy to correct the evil, either by receiving the emanations into vessels with a saturated solution of some of the chlorides, or by substituting for the present open chair, an air-tight vessel.

The Committee appointed to arrange the fittings, &c., at the new Secunderabad hospital, strongly urged the necessity of providing decent closets, provided with water or waste paper. China earthenware or glazed pans should be substituted for the brass which are objectionable, because of the smell which they retain, and because of the change in a sick man's excretions which rapidly takes place in them. Patterns for an improved hospital night chair should be invited, and a prize in the form of an extensive contract held out for the approved pattern.

Medical comforts, &c., for the Sick.

I consider that the checks now imposed on the Surgeon in the administration of comforts to the sick are apt to produce injurious results. Having organized a Medical and Purveying establishment for 30,000 men in Europe, and been actively engaged with little interruption for six years as Inspector General of Hospitals in inquiring into all relating to equipment and supplies, the treatment of sick, and supervision over hospitals in India and in the Crimea, I may perhaps be permitted also to observe that the system now being inaugurated, of entailing on the Medical Staff matters of detail alien to their strictly professional duties, is not a salutary one.

What we require is, to establish principles which will clearly define the duties of the Purveying Officers, and the relation which these duties bear to those performed by Medical Officers, in such manner that the responsibilities of each class of Officers shall be distinct and definite and their freedom of action entire.*

* Regulations for the guidance of the Purveyor's Department, War Office, $\frac{7097}{25}$.

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An organized Purveyor's Department similar to that attached to the Home Army is what we require in India, founded on the future organization of the Medical Department, namely, a Purveyor-in-Chief in England, Principal Purveyor at each Presidency, and a Deputy Purveyor at the head-quarters of each division of the Army. The reduction in the Commissariat Staff, which the separation of the duties of hospital and army supply must in this case occasion, will place a trained native subordinate agency at the disposal of the Purveyor's Department.

Attached to all our European Hospitals should be a room under charge of the Hospital Serjeant, to which convalescents might resort, furnished with books, cheap and instructive Periodicals, Draughts and Chess boards, &c.

I have already remarked on the limited supply of gallipots and phials furnished to Medical Stores. In several hospitals I observed the evil effects resulting from this circumstance; Chloroform and volatile tinctures (issued in quantities of a few ounces) in common bottles with corks, and extracts done up in paper parcels. Of course these medicines speedily become inert. But as the Committee which recently reported on the Medical Stores at the Presidency, have entered fully into the subject of medicines, surgical instruments, &c., I have nothing further to add than to record my cordial assent to their recommendations.

Hospital 1st Regt. Light Cavalry.

The house used as a Hospital for the 1st Cavalry, is a private bungalow rented by Government at Rupees 50 per month. It is capable of containing thirty beds, comfortably. The average number of sick is fifteen. Sporadic cases of cholera have occurred of late. The prevailing diseases are ephemeral fevers. The repeated changes made amongst the Medical Subordinates attached to these Native Regiments, is stated to destroy that confidence which should exist between them and the men and their families. The hospital and grounds around are remarkably clean, and the regulations of the service are strictly enforced.

Hospital 1st Recruiting Infantry Depot.

The sick of the 1st Recruiting Depôt are accommodated in a ward of the hospital of the 1st Cavalry. The Medical Officer in charge states that from ten to fifteen recruits are enrolled daily, and each recruit is vaccinated as he is passed. The Surgical instruments in the possession of the Assistant Surgeon are of a very inferior order, the amputating knives being adapted only for the circular operation, and he has but two Catheters, Nos. 6 and 14. The pocket cases are good and well kept.

Hospital 21st Regiment N. I.

A bungalow rented at Rupees 30 a month is now used as a Hospital for this Regiment. It is well situated as regards the new lines now being

SERIES III. SECTION I.

erected for the men. It is well raised, divided into one large, and several small apartments, and capable of taking forty beds; with a little ventilation it could be made into a first rate hospital. It would be prudent to convert it into Government property, and have it properly repaired and arranged as a hospital, under the superintendence of the present Medical Officer. The average number of sick ranges from twenty-one to thirty, an unusual number in a Native Regiment. But so long as the men live in the town, many of them four miles from their duty, while their lines are being built, the sick list is not likely to diminish. There are some sporadic cases of cholera and small pox; fevers and rheumatism are also present. The building is dirty and very much out of order; but it is private property, and the Officer Commanding the Regiment is unable to get the landlord to repair it. Medicine is abundant, and Surgical instruments and books are in good order.

Hospital 34th Regiment L. I.

This hospital is well situated, raised, and well ventilated. The lines are clean and not far removed from it. We find, therefore, the sick few in number, and the recoveries rapid. There were only nine trifling cases under treatment, and neither epidemic nor endemic disease. The sick lie on iron cots of a superior construction, and the bedding is in good order. The regulations of the service are strictly enforced; and the Medical Officer reported that his medicines are abundant, and his Surgical instruments, all that he desires. Vaccination is not kept up in a satisfactory way. The men reluctantly bring their children to be operated on.

Hospital 2nd Extra Regt. N. I.

This hospital forms a wing of that last noted. In point of elevation, position, and construction, the buildings assimilate, save in one particular, namely, ventilation. The men live in huts close to the 34th, yet the sick list, with a strength about one-half that of the 34th, averaged ten, two cases of cholera being under treatment. The difference of temperature between the two apartments, in consequence of the absence of roof-ventilation in the one, was very perceptible to the senses, and the result of my inquiries showed a marked difference in the rates of recoveries of the patients. I recommend that roof-ventilation be adopted in this hospital, which can be done without difficulty. The Surgical instruments here are modern and in good order, and medicine is reported sufficient for all the wants of the Corps. Vaccination is not kept up in a satisfactory manner.

Jail Hospital.

This jail is situated between the town and suburbs, in the vicinity of three burial grounds, the soil of which is daily disturbed to deposit bodies, which are now being piled one over the other. The situation on which

it stands is low. It is difficult, therefore, to carry off the filth in the main drain, into which it passes from within the court, by repeated flushing of water. The inhabitants in the town make the neighbourhood a public necessary. The fœtor is, therefore, abominable, and its effects cannot be otherwise than deleterious. We consequently find diarrhœa, atrophy, and anasarca, almost always present amongst the sick. The hospital is detached from the jail, capable of containing ten patients. Roof-ventilation both in the hospital and in the cells would materially add to the comfort and health of the inmates. There is nothing that marks the results of bad ventilation, more than the effect it has on abraded surfaces. In the Trichinopoly jail, we have this circumstance fully exemplified; the smallest scratch having always a tendency to become a sloughing phagedenic ulcer.

Civil Dispensary.

In 1842, the 1st year in which this institution was established, the number of sick who received medical aid was	386
In 1845, the number treated was	2,805
In 1848, there were treated	2,954
In 1851, the number increased to	3,881
In 1854, there were treated	4,005
In 1857, those who received relief, numbered	23,869

There is a hospital for both sexes; and the building is capable of accommodating from forty to fifty sick; the average of in-patients is 27, severe cases only being admitted. The Native Assistant Surgeon sees and prescribes for all ordinary sick; cases of importance being referred to the Medical Officer. The labor of introducing into the book the names and prescriptions of all who apply for aid, besides having to make out returns and keep up the records, is a severe task on the establishment. I recommend that an additional subordinate be permanently attached to it. The prevailing diseases are fevers, bowel disorders, and syphilis. The amount of good effected by this establishment is incalculable.

SECTION II.

Civil Station, Tanjore.

Section II.

This station is situated thirty-three miles south of Trichinopoly, and is the capital of the district of the same name. It comprises the delta

SERIES III. SECTION II.

of the river Cauvery, is mostly level, and is one of the most fertile and valuable portions of British India. The city of Tanjore is on an arm of the Cauvery, is pretty regularly built, and is about six miles in circumference. It consists of two portions, separately fortified, one comprising the Rajah's palace.

The climate is very healthy, and is entirely free from miasmatic exhalations. The inhabitants enjoy good health, and generally speaking attain a great age. The Cauvery fills in the months of June and July by the south-west monsoon when the water descends from the mountainous regions, and again in November by the north-east monsoon. The distribution of water is regulated by anicuts at the north and south end of the island of Seringham close to Trichinopoly; and thus what would otherwise have been an arid and barren plain, has become the most fertile, rich, and populous district in this Presidency.

There is a Detachment of the 2nd European Light Infantry numbering sixty men, and a like number of the 34th Light Infantry; the former comfortably housed in chuppered houses in the Resident's compound, and the sick are accommodated in a roomy and well ventilated building. The men of the 34th Regiment Light Infantry are also very healthy, their sick being placed in a ward of the same building. A Native Dresser paid by local funds is in charge of the Civil Dispensary. I was upon the whole well satisfied with the state of the hospitals, books, &c. But I do not consider it prudent to leave the sole charge of so many Europeans to the Assistant Apothecary, and would recommend that the Assistant Surgeon at Combaconum should be called on to visit the station of Tanjore thrice every month, or oftener if necessary.

SECTION III.

ZILLAH OF COMBACONUM.

SECTION III. Jail Hospital.

The District of Combaconum is almost the richest part of the province of Tanjore and is noted for its salubrity. The jail is erected on a low sandy piece of ground near the river, and although every attention is paid to cleanliness, it is one of the most unhealthy jails in the Presidency. The fact is, the drainage is bad and cannot be improved. The privies are close to the wells. The space around the cells is too circumscribed by high white-washed walls which throw out great reflected heat;

the cells are badly ventilated, and finally the walls themselves have become polluted by miasmata, and convey the pestilence that pervades the jail to all its inmates. Sores take on an unhealthy action; diarrhœa is most prevalent and fatal, as it rapidly runs on to ulceration of the bowels, or anasarca. Strong healthy men no sooner enter the precincts of the jail than they droop in health. On approaching it before I was aware of its unhealthiness, I was plainly sensible of an overpowering and offensive odour, and I mentioned this to the Sub-Judge, who took me there. SERIES III. SECTION III.

SECTION IV.

NEGAPATAM.

SECTION IV. Hospital Detachment 34th L. I. and Civil Dispensary.

The sick in the Detachment 34th Regiment Light Infantry are healthy. Very great advantages result from the aid afforded by the Civil Dispensary. At the sea-port, European and Native troops enter the Southern Division by sea. Trichinopoly is about one hundred miles inland. A system of transit for European troops might be established without difficulty on this road; for the cattle are good and numerous in these Districts, and could convey parties in two nights to their destination. This system has been carried out most successfully from Madras to Mysore and in the Ceded Districts, to the great saving of human life.

Negapatam possesses an equable and moderate temperature, and enjoys a great immunity from disease. Point Calymere situated on the coast twenty-eight miles south of Negapatam, forms a considerable promontory, having the sea on both sides. It is much famed for the salubrity and coolness of its climate, and is found an agreeable retreat during the hot months in the interior.

The Detachment of the Regiment stationed here is very healthy. The sick occupy the building used as a Dispensary, which stands much in need of repair, the walls being rent and the roof tumbling down. There is also a Poor Hospital in the town of Negapatam, two miles from the Dispensary, which the Apothecary attends.

The jail, and jail hospital are in a wretched state. Bugs are in myriads, and the accommodation is as bad as it can be. The prisoners are sickly, and suffer a good deal from diarrhœa. Medicine is sufficient for all purposes. The Assistant Surgeon stationed at Tranquebar visits this station thrice every month.

SERIES III
SECTION V.

SECTION V.

TRANQUEBAR.

Hospital Detachment 34th Regt. L. I.
Jail Hospital.

This station was until lately a Danish Settlement. The European community live in the Fort which borders on the sea, where there are houses well adapted for barracks for European soldiers. It has been proposed to make Tranquebar the sanitarium of the Southern Division in consequence of the existence of the buildings just named. The climate is highly spoken of for its salubrity. But I question whether it is likely to promote convalescence although it may be well adapted as a residence for people in health; for although there are few soldiers sick in the Detachment 34th Regiment Light Infanty, the sick prisoners who have of late been sent down here in numbers from Combaconum rapidly droop; it is a rare case to find any of them convalesce. They have not, however, the full benefit of the climate, for they are placed in an old bomb-proof low-roofed warehouse, with a door or window only in front. The Surgeon reports to me that prisoners are sent to Tranquebar in the last stage of disease; in order to give these men a chance of recovery they ought to have a spare ward at the General Civil Hospital, but until better accommodation can be provided for prisoners there is little prospect of any benefit being derived by sending them to the station at all. Medicines and Surgical instruments are in good order. The Surgeon has a considerable European community of old Danish families to attend to, and he has the station of Negapatam also under his charge.

SECTION VI.

MADURA.

SECTION VI.

Government Dispensary, Jail, and Hospital Detachment 51st Regt.

The Civil Station of Madura lies eighty-three miles to the south of Trichinopoly. To the north and west of the district, the surface is mountainous, elsewhere level and highly productive. The western mountains divide the district from Travancore in part running to the south-east, while a chain of hills takes a north-eastern course, and extends for more than twenty miles towards Trichinopoly. The subject of hill ranges is treated in a separate section. I have not seen any native town so clean and well drained as Madura. The Pagodas and extensive ruins of a regal palace erected in 1620 are its attractive features. I am informed that in the Cumbum valley, sixty-six miles from Dindigul, there is a stream of water which petrifies vegetable or animal substances placed therein.

The Jail consists of old houses patched up to receive prisoners. No place could be worse adapted for the purpose of massing men together, which the want of space obliges the authorities to do here to an intolerable extent. I learn that it is proposed to build a new jail. I examined the site pointed out for this purpose, and I unhesitatingly condemn it. It is too exposed, it is too low to secure a good system of drainage, and the only water in the neighbourhood is brackish. I would urge for the consideration of the Director General the necessity of consulting the medical authority on the spot, in all cases where Government money is about to be expended on public buildings, both as respects situation and construction. In company with the Surgeon of the Zillah, I selected a more eligible spot for the erection of a jail than that fixed on by the Inspector of Prisons. Prisoners are vaccinated on admission. Diarrhœa is the prevailing disease ; there has been no epidemic small-pox during the ten years the present Surgeon has had charge. The Civil Dispensary is much resorted to. The average daily sick in hospital for the year ending 1856 was twenty-two, and of those treated out of hospital 173. The Detachment 51st Regiment Native Infantry enjoy excellent health, and there were no sick at the period of my visit.

SECTION VII.

Tinnevelly and Palamcottah.

Section VII. Civil Dispensary and Jail Hospital.

The stations of Tinnevelly and Palamcottah are so contiguous that they may be treated together. The climate is very equable, and they receive the rain of both monsoons. Tinnevelly is ninety miles west of Madura, the climate of which it resembles. The Civil Hospital is very freely resorted to by the native community. The average number treated in hospital for the year ending 1856 was twenty-nine, and those who received relief out of hospital averaged during that year 129; the prevailing diseases being of a cutaneous character, including ulcers and venereal affections. Cholera is rare in this district, and small-pox has been almost unknown for seven years. Vaccination is kept up effectually through the exertion of the Collector. There is a large community of Christian Protestants (about 40,000) in the district. The jail is a double storied old Chuttrum, surrounded by a high wall. The space allotted for the prisoners, three hundred in number, is too small. The percentage of sick is about five, diarrhœa

SERIES III. SECTION VII.

and fever being the common diseases. The hospital is commodious, upper-storied, and well ventilated.

Friend-in-Need Society Hospital.

The Friend-in-Need Society Hospital is supported by private contributions, Government granting medicines. On an average twenty patients are treated there daily. The building is admirably adapted for a hospital, and is divided into four commodious wards, in which male and female patients are classified, there being also a ward for the treatment of maniacs. Its construction is superior to any of the Civil Hospitals I have yet seen.

Hospital 51st Regiment N. I.

The hospital 51st Regiment Native Infantry is spacious, well aired, and lofty. It was formerly used as a barrack for European troops. The men are very healthy, the average sick soldiers rarely exceeding ten. Two deaths occurred recently from cholera.

The Surgeons at this station and at Madura, are obliged to keep a writer at their own expense, to aid in keeping up the books and returns. I was much pleased with the state of every department here. The regulations of the service are strictly enforced.

Hills in Travancore.

The surface of the Travancore country to the east is mountainous; elsewhere it is varied with hill and dale and well watered. Some of the hills vary in altitude up to 4,700 feet, at which height there is a considerable plateau of rocky, irregular table-land. The Rajah of Travancore has established in his dominions several charitable institutions for the relief of the sick. The Trevandrum Charity Hospital supports and gives medical relief on an average annually to 1,150 patients; at Quilon, the Charity Hospital has an annual average of 200 patients; and that at Alleppy averages 900. The Civil Dispensaries are under charge of the Physician to the Rajah, and a local Medical Officer affords medical aid to the sick of the Nair Brigade.

The sale of poison is checked by Police regulation in Trevandrum, certain parties being licensed to keep and dispose of a limited quantity, which license is not renewed unless they can satisfactorily show how they have disposed of what they formerly received.

SECTION VIII.

Quilon.

Section VIII, 2nd Regt. N. I.

There is excellent back-water communication between Trevandrum and Quilon. The climate is agreeable and healthy for natives, but to

PLAN OF THE MUD BANK OF ALLEPPE IN TRAVANCORE

SURVEYED BY CAPTAIN JAMES DARDEL OF THE BOMBAY ENGINEERS IN 1804.

REFERENCE.

A. *A tiled large house occupied by the British Resident which is seen at a good distance, and running in it must be E N 70° E and with that bearing you may anchor as near the shore as you please.*

B. *The lines.*

C. *A space between the trees and Bankshall, which kept open is the best guide to run in and anchor.*

D. *Two Bankshalls.*

E. *Flag Staff.*

F. *A small sand eminence which is seen from a good way off.*

REMARKS.

The figures denote the depth taken at low water in English feet.

J. Murphy Supt. and Manager
Govt. Lith. Press, D. P. W.

E. T. Horsley. Lieut. Colonel
Chief Engineer.

the European constitution, it is enervating, recoveries being slow after attacks of illness. Indolent ulcers of the lower extremities, cutaneous diseases, and elephantiasis are common. A spur of the lofty range of mountains referred to in the last section reaches to within twenty miles of Quilon. On this, coffee and spices are cultivated in large quantities by European planters. The men of the 2nd Regiment Native Infantry are healthy. The sick range from twelve to seventeen. A well ventilated and comfortable hospital is now in course of preparation. Medicine is good and abundant, the state of the Records and of the Surgical instruments is creditable. SERIES III. SECTION VIII.

SECTION IX.

Cochin.

The distance between Quilon and Cochin is accomplished easily and expeditiously on the back-water by boat. About half-way is the seaport town of Alleppy, from whence the chief produce of the Travancore State is embarked. There is a singular and interesting natural phenomenon connected with this port, which I would here record. Stretching along and running parallel with the coast from Calicut to near Trevandrum, a distance of about 200 miles, is a line of back-water having one main estuary to the sea at Cochin. There are also smaller artificial and natural passages by which the monsoon rains escape, and which are used for traffic purposes. This back-water is intersected with numerous mountain streams, while inland, the country rises more or less abruptly to the foot of the hills, distant on an average forty miles from the sea. Three miles from Alleppy due east, the back-water is eleven miles broad and very shallow, until the sand bank on which Alleppy stands is all but touched. There and near the entrance of the canal leading to the town from Quilon and Cochin, the depth suddenly passes from seven and eight to fifty and sixty feet, with a bottom of soft mud. For an extent of two miles north and south along the beach nearly opposite to this position, more especially after the rains have set in, a sudden upheaving is observed at a distance of fourteen to twenty feet from low-water mark, vast quantities of soft rounded masses of blue mud are thrown up, thus forming a bank, and the beach falls in, leaving long fissures above high water mark. At a distance of 100 yards from the beach Mr. Crawford, Agent to the Travancore Government, from whom I received SECTION IX. Civil Dispensary and Small-pox Hospital. Detachment 2nd N. I., and Jail Hospital. Sircar Hospital.

SERIES III. SECTION IX.

the above particulars, sunk a shaft to a distance of fifty feet. The soil passed through was sand twenty feet; rotten sandstone two feet; then fifteen feet of stiff clay, succeeded by sand and clay mixed, the latter becoming hard and compact for two feet when the shafting ran down so rapidly that it was with much difficulty we succeeded in preventing it from going down altogether. The soft mud brought up in the valve bucket resembled in appearance that thrown up at the agitated spot on the sea at low-water. A short distance further out to sea there is another bank of mud (*vide* plan), the surface of which is of so plastic a nature that it floats on the wave, but remaining at the same time attached to the more consistent mud below. This forms a complete back-water, and, whatever may be the fury of the elements out at sea, within this bank, the water is perfectly smooth, demonstrating that the wave after all is of no depth.

Although this is an open roadstead, there is seldom any surf on the beach at Alleppy. It is the only port on this coast into which a ship can run if disabled during the south-west monsoons. The sea breaks on the mud bank in six fathoms. Ships or Steamers of 1,000 tons pass through the breakers without injury, and conduct repairs inside this bank with ease and facility. Captain Cope, an old Navigator, calls this place " Mud bay," and states " it is one of the most curious places " in ye world."

After the rains, and when the force of the south-west monsoon has been broken, the outer bank shifts to the southward about two miles, and there is then considerable surf on the beach. But so soon as the monsoon sets in, the bank immediately reforms, the beach and anchorage become as smooth as a mill-pond, and thus a natural harbour of refuge is formed.

It is difficult to account for this remarkable phenomenon. The tradition on the spot is that there are subterranean passages from the back-water to the sea, through which the superfluous water flowing into the back channels finds exit, and admit of the regular ebb and flow of the tide; that the ground on which the town of Alleppy stands was formerly nothing but a sand bank in the sea, and that in fact it is now only a floating island moored to the main land by a succession of coral strata or other formation.

Ship building is extensively carried on; a ship of 1,000 tons has lately been launched. The trade at this port is rapidly extending.

Coffee, cocoanut and coir, are the chief exports; about 40,000 tons of the latter were shipped in 1857, and the place is daily rising in importance.

The weather is never cool and bracing at Cochin; the climate is at all times more or less moist, so that it is seldom very hot; a continued droughs is almost unknown, and it possesses the advantage of an equal temperature throughout the year; the maximum of the thermometer being 85, and the minimum 78 degrees.

The populations are chiefly descendants from the Dutch and Portuguese. The Roman Catholic Christians are very numerous, and their Chapels form quite a feature in the district; the poorer orders are a low and degraded set, amongst whom prostitution goes on to a terrible extent. Venereal disease, in its worst form, is the curse of the town, and to such an extent has it now arrived, that it has become an ordinary occurrence to find the primary and secondary forms of this malady occurring simultaneously. It is from this deplorable state of matters that we find cutaneous affections in their most hideous forms so common. They form a large number of those who seek relief at the Dispensary. A separate small-pox hospital has been erected by public subscription. Here venereal cases will receive treatment in a ward by themselves. It is detached from the Civil Dispensary. It was found that the presence at the Civil Hospital of patients afflicted with these disorders deterred the better class of people from seeking advice. Dr. Leslie, the Surgeon, seeing the necessity of a change, by his own unaided exertions collected the funds to build the present hospital. The number of patients who applied to the Civil Hospital on the first month (March) after its formation in 1851 was ninety-eight. On the same month in 1858, the period of my inspection, the number who received relief was 474. There is but one Native Dresser to assist the Surgeon at this station; were this man to work every hour in the twenty-four continually, he would be unable to do the duty expected from him, nor is it possible for the Surgeon, with his numerous professional avocations, to do the Dresser's duty also.

Hospital Detachment 2nd N. I., and Jail Dispensary.

The Jail Dispensary is so close to the Travellers' Bungalow, that it appears on first sight, both from size and situation, to be the cook-room attached to it. It was brought to my notice that on more than one occasion, a family with a number of children resided in the bungalow, and in the Jail Hospital adjoining there was small-pox and other disorders of an infectious nature. The sick of the Detachment 2nd Regiment Native Infantry are accommodated in comfortable quarters, and the men are

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healthy. The Surgeon informs me that the medicine supplied is not sufficient for the demand.

Sircar Hospital, Ernacollum.

At Ernacollum, four miles from Cochin, across the back-water, is an admirable institution for the relief of the Sircar sick supported by the Rajah, and conducted in a very creditable manner. Although on rather a limited scale, it does much good, and it has the advantage of a skilful Apothecary also in the local service.

Nine Vaccinators are also kept up by the Rajah, who itinerate all over the country under the direction of the Surgeon. But the results are not satisfactory.

SECTION X.

Calicut.

SECTION X.

The town of Calicut is but little above the level of the sea. It consists of one extensive street and smaller cross streets running from it, with open stone channels to carry off the superficial water to the sea. To the south of the town is a dense population of Moplahs; here there are numerous mosques and burial grounds, to which reference will be made in another section. There is a tank of pure fresh spring-water, 200 yards square, built round with granite, to the east of the town, many of the other springs being brackish. The houses are built of laterite, which is cut out of the parent soil in the form of bricks and dried in the sun. The chief feature along this coast is the dense forests of cocoanut trees which extend for several hundred miles. The fruit of this tree is exported in large quantities.

A lofty range of mountains, in many spots richly impregnated with iron and covered with dense forest trees, rise to the eastward; the most conspicious being the Pompaurany, distant about eight miles from Calicut.

The Beypoor river flows into the sea six miles from Calicut. Here is placed the Western Terminus of the Madras Railway. An extensive foundry for the manufacture of iron has been recently formed here by an English Company of Merchants; and as there is free water communication from the interior and from both sides of the coast into this river, the town of Beypoor will likely become a great depôt for teak timber and other produce from the interior.

The soil on the spurs and around the base of the mountains, especially in the Wynaad District, is a rich loam: here coffee and spices are cultivated on a very extensive scale by European planters, and notwith-

standing that much water falls and lodges over the whole of this coast, in consequence of the nature of the soil, the salubrity of the atmosphere does not appear to be affected thereby, more especially now, that the extensive brushwood and low jungle is rapidly being converted into garden land by the energy of the European settlers who are yearly increasing in numbers.

Ulcers and elephantiasis are endemic over the District of Malabar. These diseases attack all parts of the body; they resist all remedial measures; and leave the subjects of it dreadful objects. Bowel disorders terminating usually in anasarca and cutaneous affections, in all their varied forms, are of frequent occurrence and very untractable. These maladies are usually the sequel of malarious fever and are purely diseases of debility. Cholera at times makes terrible inroads amongst the population.

Hosptl. Dett. H. M's. 66th Regt.

On the date of my visit to Calicut, the Detachment of Her Majesty's 66th Regiment (strength 105 men) had been stationed there. A commodious private house was secured for them in an open and airy position. I found the men in excellent health, and their comforts in every way attended to.

The situation of the bungalow occupied as an hospital, is objectionable. Immediately in front of it is an offensive stagnant tank, used by the natives for all filthy purposes. An extensive burial ground is close to the left, and the hospital is surrounded on the other two sides with native bazars and dwelling houses. Apart from the position, the building itself is not adapted for European sick, and it is at too great a distance from the barracks.*

Hosptl. Detachment 11th Regt. N. I.

Three Companies, 11th Regiment Native Infantry, are stationed here. The men are healthy. The hospital accommodation for the sick of this Detachment is very poor; it is low in the roof, without ventilation, and the apertures which answer the purpose of windows are merely provided with bits of matting to exclude the sun or the night air. It is also too much surrounded with native huts. A building capable of receiving the sick of the European and Native Detachments, for which one set of hospital servants and one Dispensary would answer, should be constructed at this station.

Civil Dispensary. This should be made in part self-supporting.

The Civil Dispensary was opened in 1846. In that year 1,137 patients received relief; in 1851, 2,987 were treated; in 1856, or five years later, the applicants for relief numbered 5,105; and this year, 1858, exhibits a further increase of 1,115 or 6,220 treated. When we consider that a somewhat similar state of matters exists at all the Government

* Since this Report was made this Detachment has been removed to another site—a healthy, well-elevated position, two miles out of the town.

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Dispensaries, and that very many of those who receive gratuitous aid at these useful establishments, are men in good circumstances, engaged chiefly in trade and residing in town, and contribute nothing to the State in return for the very many advantages they receive, it becomes a question of importance, how far the generous liberality of the Government ought to be thus taxed. Through these institutions an inestimable boon is conferred on the poor of the land, and the more wealthy classes avail themselves of the advantages gratuitously rendered. All appear to be fully alive to the necessity of their existence, for the applicants for relief increase as above shown by thousands annually. I think the time has therefore arrived when, at some of the more opulent cities, these institutions may be made in a great measure "provident," or "self-supporting"; the proceeds to form a fund for the repair of the Dispensary buildings, and to aid in carrying out hygienic reforms in the town and neighbourhood.

I would recommend the appointment of an ex-officio Committee at each Civil Dispensary, to consist of the Judge, the Collector, and the Surgeon. During the introduction of the new system, the Commitee should meet weekly, to see that none but the aged and the afflicted, and other members of the community incapacitated for labor by maladies of a curable nature, are admitted to the gratuitous benefit of the institution. Each out-patient should be provided with a ticket, and be made to attend with his prescription paper at an appointed time, once a week or oftener if necessary. The words "Free Member" to be imprinted on such tickets.

For all others I would establish a fixed charge for the privilege of attending the Dispensary, to be paid in advance; say five Rupees a year, three Rupees a half year, two Rupees a quarter, and one Rupee a month; the sums deposited to be noted on their tickets with the words "Subscribing Member" printed thereon, and an increase of one Anna to be made to each of these sums for every member of the same family applying for aid.

I do not anticipate that there would be any great difficulty in carrying out a system of this sort, more especially if the hearty co-operation of the Civil authorities is afforded, and the Surgeon gives his regular and zealous attendance to the paying applicants, at a fixed hour daily; and these should be received, prescribed for, and examined in an apartment separate from the "Free Members."

As matters are at present conducted, the Surgeon frequently experiences much difficulty in procuring additional clothing for the sick, white-

SERIES III. SECTION X.

wash for the walls of the hospital, slight repairs to the building, &c. In several cases I have found, that after ineffectual endeavours to procure what he wanted, the Surgeon was at length constrained to expend his own means, in order to ward off evil consequences to the sick by the want of white-wash for the walls.

There were thirty-five sick in the Calicut Hospital, some of the diseases being of rather a grave nature. The daily average of out-patients treated was seventy. The establishment consisted of one Native Dresser, one ward cooly and one toty. The Native Dresser had not only to dispense medicines for about 100 men daily, but he had also to keep up all Hospital Records, and prepare voluminous Returns. The services of the two other attendants were in constant requisition. If no limit is to be placed on gratuitous admissions, it will be absolutely necessary to increase the permanent establishment of these Dispensaries. The allowance of clothing is also too scanty. In this hospital I found that the patients had worn their clothing for six days, and there was no change to give them. It is manifest that neither can disease be checked nor cleanliness established under present circumstances.

Jail Hospital.

In the jail at Calicut I found 300 prisoners. Although the discipline in this jail is necessarily severe, on account of the wild and ungovernable character of the inhabitants of the district, I have in no place seen a better ordered jail, or one more free from impurities. The cells are spacious and well ventilated, remarkably clean, and free from vermin. Here the men are really made to feel what jail discipline is; they are usually well flogged on admission, and during the period of their incarceration, they find that road-making, &c., is really a punishment. It is asserted that in some of our jails, the prisoners, on completing their period of sentence, put aside their cooking pots with instructions to their comrades to look after them until their return, which speedily takes place; but the return of a convicted prisoner to jail at Calicut, when once discharged, is a rare occurrence. Yet with all this discipline, the prisoners attain considerable increase in bulk and muscularity. Fifteen cases of variola, swelled the sick list at the period of my inspection, but the remainder had trivial ailments.

SECTION XI.

Mulliapoorum.

SECTION XI. Hospl Detacht. H. M's. 66th Regiment

The strength of the Detachment of Her Majesty's 66th Regiment at this out-station, which is thirty-six miles inland from Calicut, is 130. They

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are now, and have been very healthy; two men only being on the sick list. The barracks are commodious for 100 men, the remainder being placed in quarters assigned for married men, as there are no families with the Detachment. The barracks and hospital are placed on an elevated ridge of ground and are well raised, lofty, and possess free ventilation. The men amuse themselves on the skittle and cricket ground, and with private theatricals. But the Medical Officer brought to my notice, that a library of instructive and moderately priced works was much desired by the men, who were unable, on account of stoppages from their pay to subscribe a sufficient amount amongst themselves. A small grant-in-aid from Government to procure to Recruits arriving from England some of the cheap and instructive periodical literature of the day, would be a great boon to the men, especially at out-stations.

Charitable Dispensary.

The Charitable Dispensary has been but recently established. It is of great service to the community, placed as it is in the midst of a population who always carry knives on their persons, which they use on the slightest provocation; it has already been the means of saving many a life. An interesting feature in this country are the detached houses and gardens, which are usually enclosed with mud bank and ditch; many of the houses are of two stories, having a ladder communication above, from the outside, which is drawn up at night when the family retire. These houses are usually built under the shade of trees, and they each form a sort of fortress in themselves. The houses in the villages are somewhat similarly constructed. The Nairs and Namboodies live chiefly in the garden-houses, while the Moplahs and Teers predominate in the towns.

Malabar Police Corps.

The Malabar Police Corps numbers two hundred men; they are chiefly Nairs, and are an athletic and handsome body of soldiers. They have had some sickness, but are now free from it.

SECTION XII.

Tellicherry.

Section XII. Hospl. Detacht. 3rd Regt. L. I. Jail Hospital.

The small and very beautiful station of Tellicherry is fifteen miles from Cannanore, and six from the French Settlement of Mahé. Low hills, clothed with wood and interspersed with valleys, here approach to within a very short distance of the sea, and the salubrious climate is generally acknowledged. The average annual fall of rain on this coast

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is from 120 to 140 inches, and the soil is amazingly productive. The low-lands yield usually three crops of rice annually, and on the higher ranges the culture of spices and coffee is extending rapidly. As at Calicut, the cocoanut tree is a great source of profit to the agriculturist. From the wood, which is rapid in growth, boats, frames for houses, and rafters are constructed, and toddy is extracted from the tree by incisions; the leaves are used for thatching, basket and mat-making. The nut affords food, oil, and charcoal, and its outer rind an excellent fibre for the manufacture of rope and matting. A large quantity of very superior arrow-root is prepared at this place for the English market. An Apothecary is at present in temporary charge of the station. The Jail Hospital is wanting both in space and ventilation, and is not suited for the reception of sick. The room adjoining it is used as a manufactory for fish-oil, the stench from which pollutes the air around. The cells for the reception of prisoners are also within the same enclosure; these are lofty, well ventilated and not over-crowded. There is no public Dispensary at this station, but sick of the country resort to the Jail Hospital for advice to the number of ten daily.

Jail Hospital.

The men of the Detachment 3rd Regiment Light Infantry are in excellent health. The quarters for their sick are indifferent.

Detachment 3rd Regt. L. I.

SECTION XIII.

Cannanore.

Section XIII. Hospital H. M.'s 66th Regiment.

The climate of Cannanore resembles that of other places on the coast. The station is close on the sea surrounded by low hills. From the porous and gravelly nature of the soil over rock, it is peculiarly dry even in the rains. The maximum of the thermometer is 88°, and the minimum 68°. On an average 120 inches of rain fall annually, and six inches have been registered in one day. Her Majesty's 66th Regiment arrived at Cannanore on the 1st December last. The strength at Head Quarters is 640. The men of the Regiment are a fine looking body of old soldiers. There are thirty-five sick in hospital, chiefly the result of syphilitic inoculation. Almost all the chancre cases present the well marked Hunterian indurated base. In some of the men buboes appeared almost simultaneously with the sore, and in others the consecutive symptoms are more or less intense. There is every probability, that some of these men will be permanent sufferers.

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The Barracks occupy an elevated and healthy site 500 yards from the beach; they are sufficiently commodious, but are defective in ventilation. The hospital is an admirably constructed building, well elevated, freely ventilated, having ample room for the sick and provided with every convenience.

Garrision Hospl. and Medical Stores.

The strength of the Details at Cannanore is 236. There are also from seventy to eighty convicts. The average number of sick of all classes per annum is sixteen. It is a good and capacious hospital, having separate wards for Europeans and Natives. I was not satisfied with the state in which I found this hospital, nor with the Medical Stores; but on this subject, I beg to refer the Director General to my confidential report, dated Mangalore, 26th February 1858. In the Records of the Superintending Surgeon's Office at Cannanore, I perceive that Dr. Cole, the former Principal Medical Officer of the District, recommended that a public Dispensary be established at the town for the relief of the sick poor. Doubtless the advantage to the community would be considerable, and in adding my support to Dr. Cole's recommendation, I would commence by making it "self-supporting" as recommended above, forming the Committee of management from the Brigadier, the Surgeon and the Chaplain. Fevers in their various types and cutaneous affections are the prevailing diseases of this locality.

Vaccination is kept up within the limits of the garrison. Small-pox of a mild type is frequent, but cholera rarely assumes the form of an epidemic.

3rd Regt L. I. 11th Regt. N. I.

The strength of the 3rd Regiment Light Infantry at Head Quarters is 600, Sick in hospital fourteen; and the strength and sick of the 11th Regiment is about the same. The hospitals for both Corps are contiguous and built on one uniform plan; a centre room capable of receiving thirty sick, and end rooms for Dispensary and Store-room, but both are deficient in ventilation. The privy and cook-house are thirty yards distant from the hospital, and between it and the sea, thus not only impeding the sea-breeze, but also contaminating it.

SECTION XIV.

Mangalore.

Section XIV.

Mangalore is the principal Military and Civil station in Canara, and is situated in the immediate vicinity of the sea. There is an extensive

back-water on two sides of the Cantonment into which the tide flows for nine or ten miles. The ground occupied by the Military and Civil authorities is undulating, and immediately beyond it there are hills of some elevation, rugged in aspect, and covered with a scanty grass and low jungle; but the valleys possess deep rich soil, and usually yield three crops within the year; an extensive trade is carried on between this place and the Arabian ports. SERIES III. SECTION XIV.

16th Regiment.

The climate of Mangalore differs but little from that of other stations on the Western Coast. To European residents it has a depressing tendency, and convalescence from sickness is exceedingly tedious and unsatisfactory. There is now only one Regiment at Mangalore. The hospital is an excellent and commodious building, it was originally intended for the sick of two Corps. The strength of the Head Quarters of the 16th Regiment is only 319, and there are eighteen sick in Hospital. The men look weak or atrophied, which is attributed to the climate, the sameness of diet, and the quality of toddy which is procured here for little or nothing; diarrhœa is the prevailing disease among them.

Civil Dispensary.

The average daily sick prescribed for at the Civil Dispensary is fifteen. The prevailing diseases are various forms of dyspepsia and its concomitants, *viz.*, bowel disorders. The station has been free from epidemic disease for two years. The Dispensary building is lofty and well ventilated, and affords accommodation for twenty sick.

Jail Hospital.

The jail is erected on an elevated piece of ground. The cells are lofty and tolerably ventilated, and the grounds around are exceedingly clean. A stone wall eighteen feet in height surrounds the building at a distance of thirty-four yards, thus forming a spacious enclosure. One of the wards is set apart for an hospital, and affords ample accommodation for the sick. The prisoners are vaccinated on admission, and small-pox is rare amongst them. Diarrhœa and anasarca prevail all the year, and the ratio of sickness and mortality is usually high in this jail, chiefly amongst the prisoners who are brought to the coast from the hilly districts, who speedily become depressed in the low damp climate of the coast. Surgical appliances and medicines are good and abundant. The Hospital Records are kept up, and the orders of the service are attended to.

Fish Liver Oil Manufactories, Calicut, Tellicherry, Cannanore and Mangalore.

The manufacture of Fish liver oil at the stations noted in the margin is usually entrusted to one of the Medical Officers attached thereto. At Calicut Assistant Surgeon Ross superintends the manufacture of the oil, having under him a Commissariat Conicopoly, two permanent and two temporary coolies at five and four Rupees respectively per mensem, and

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two night-watchers at two Rupees per mensem. Here the oil was prepared with much care. The liver of the shark alone is used ; the process is as follows :—The large vessels of the liver being first laid open, it is chopped up into bits about one inch in size ; one quart of water is put to about 20 lbs. of liver, and the mass is brought to a temperature of from 115 to 120 degrees, when it assumes the consistence of boiled arrow-root, it is then set aside. In about half an hour the oil floats on the surface, it is then skimmed off and placed in jars, where it remains twenty days, and after-wards strained through flannel and calico. On this it is put aside for fifteen days and strained in a similar manner. A third time the oil undergoes this process, and the fourth time, prior to bottling off, it is passed through filtering paper. A very pure oil is thus obtained ; but it is not so pure or so free from smell as the English Cod liver oil.

At Tellicherry the manufacture of the oil is under the charge of an Apothecary with two or three convicts working under him. At Cannanore and at Mangalore, convicts also prepare the oil under the superintendence of a Medical Officer. Considerable quantities are prepared at these stations and forwarded to Calicut for distribution to the Army, and thus the supply for the season becomes mixed up. That which I examined at Tellicherry, Cannanore, and Mangalore, was nauseous in taste and smell and utterly unfit for use. The Calicut supply was not so. Yet at almost every station visited, I found the Fish liver oil universally condemned ; and Medical Officers in charge of European troops were eager in their demands to be furnished with Cod liver oil for their men, as the effects produced by the Fish liver oil rendered the administration of it unsafe ; occasionally some bottles, they informed me, were discovered of a better description, and this I have little doubt was that prepared at Calicut. But this very useful, and in some diseases indispensable, remedy has now got a bad name, and Medical Officers have lost confidence in it.

Large quantities of Fish liver oil are, I understand, now prepared for the use of the Bengal and Bombay Army. It would be a great saving to the State, if it could be entirely substituted for the Cod liver oil of commerce, and if prepared with due care, I see no reason why it should not. I would strongly recommend that a complete establishment be formed at Calicut, and that the supply for the Army be prepared there alone ; the other establishments to be broken up.

It would be necessary that a Medical Officer be appointed to superintend the manufacture of the oil, with a more liberal allowance than

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is at present granted him for the labor; or what would be better still, that a Medical Officer on furlough, or a young man who has received appointment in England, should be encouraged to learn the details of the manufacture of plain and medicated oils (with quinine, iodine, iron, &c.), remedies which are in much use now in Europe. Meantime, however, I would again urge that the manufacture of the oil be confined to Calicut with the following establishment:—

	RS.
Medical Officer in charge, being the Zillah Surgeon...	80
Conicopoly..	30
2 Head coolies, 10 Rupees each..............................	20
2 Second class coolies, 8 Rupees each.......................	16
2 Third class ,, 5 Rupees each.............................	10
2 Fourth class coolies or watchers, 4 Rupees each......	8

When at Calicut, I had samples of the oil passed through animal charcoal and through lime, I forwarded specimens of this, so that the Director General may judge for himself of the degree of purity to which it can be brought.

Visitation of epidemic cholera in the District of Malabar.

It is now, I believe, universally allowed to be a matter beyond further question, that visitations of Cholera are governed by the same laws which mark the progress of other epidemics, and that it attacks in the largest numbers and with most severity the same class of persons and the same places as typhus, scarlet fever, diarrhœa, and the entire class of zymotic diseases.

The pre-disposing causes of cholera may be denominated—

First.—*Remote.* Produced by a disturbance of the electric and magnetic forces of the atmosphere, rendering the animal frame prone to imbibe disease.

Second.—*Proximate.* As the respiration of a vitiated or poisoned atmosphere produced by

1st.—Overcrowding or lodging an absolute number of individuals in a given space without the means of renewing the air.

2nd.—A privy, cess-pool, or grave yard, and especially the noxious influence of putrid animal effluvia, whether these proceed from foul drains and sewers, from slaughter houses, or animal dung heaps.

3rd.—Influence of impure water, polluted by percolation into wells of the contents of cess-pools, grave yards, drains, &c., contaminated by deleterious gases decomposed by organic and other noxious matter, or the original impurity of the supply.

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4th.—Defective supply of pure water, which is essential to personal and external cleanliness, and as an article of food. Water forms nine-tenths of the whole weight of the body, it penetrates into the very substance of every organ, and is the medium for all the changes effected by nutrition in the composition of the body, and as these never cease for an instant, it is constantly being introduced from without by absorption or discharged by excretion.

5th.—Drunkenness and excesses, either in eating or in drinking, are highly pre-disposing causes to cholera, during the prevalence of the epidemic.

6th.—Noxious effects of bad food inducing defective nourishment, and lastly, bodily and mental exhaustion, fear and grief, prepare the system for an attack.

There are many obscure circumstances connected with outbursts of cholera, which are as yet inexplicable to us, and the following, which has recently come before me, is one of these.

In the Salem District, six miles from Tripatoor, about 100 of a tribe of Wudders engaged on the Madras Railway were especially employed on cutting through disintegrated granite rock, and nineteen feet in depth. Suddenly springs of pure water were exposed and almost simultaneously with this a virulent outbreak of cholera appeared, which carried off fifteen of them within forty-eight hours, while a few yards from this spot where hundreds of workmen were employed, not one case occurred. I would adduce other instances in which not only cholera but malignant fevers have seized on individuals suddenly exposed to soil which had heretofore remained undisturbed. As for instance at Hong Kong when originally occupied by us, and where persons who continued in health so long as they occupied a tent pitched on the natural slope of the hill, were immediately struck down with dangerous sickness if they squared off and levelled the same space.

In whatever mode the malignant cholera passes into the frame, a poisoning of the blood immediately takes place, and we have the profuse discharges from the stomach and bowels. These we must regard as an effort of the *vis medicatrix naturæ*. Death in such cases seldom occurs under eighteen to twenty-four hours, or where the productive cause operates with intense force, we have the cholera *sicca*, in which all the secretions are arrested, and the sick man falls as if struck down by a cannon ball.

It has been my lot to suffer from this terrible malady and also to witness many outbursts of it. When the Turkish Contingent was in process of formation and about 6,000 men had been collected, it burst on us with violence, and in one week carried off 168 out of 347 seized with the

disease or 48·41 per cent. of those attacked, and 2·8 per cent. of the force. But I have never before seen or read of anything approaching to the visitation of the epidemic in the District of Malabar, shortly prior to my arrival there, the probable causes of which I was instructed to inquire into. The case was as follows. In Calicut and five neighbouring towns, it was reported to Government by the Magistrate of the district that in the course of two months 1,796 cases occurred, of which 1,539 died, the deaths to sick being 85·69 per cent. Those who were seized with the disease were for the most part Moplahs, a bigotted class of Mahomedans residing on this coast, who profess to despise European medical aid, and in this case did not, in one instance, come forward to seek it. If the mortality be as here represented, it shows how enormous must be the advantage of medical treatment in cholera, the usual proportion of recoveries being one in three.

In instituting this inquiry I personally visited the towns where the greatest ravages occurred, and satisfied myself that the Magistrate's report is a correct one. The disease on passing away, gave place to malignant small-pox, and the most hideous cases of this loathsome malady which it has ever been my lot to witness, came before me on this occasion. There was no difficulty here in tracing a cause, it was evident to the eye and to the nose, in every town or hamlet I passed through, namely, intramural burial grounds.

A baneful practice exists amongst the Moplahs, who are usually abominably filthy in their persons, of burying their dead close to their mosques, in and around the most densely crowded portions of their towns, and this has been continued until the dust of generations has reached the very doors of their dwelling houses, and in many places has accumulated several feet the level above the streets and ground floors of their houses; nor is this all, for I found placed in the midst of some of these grave yards, a well from which the inhabitants receive their water supply.

The average fall of rain on this coast is 120 inches or ten feet per annum, and the soil thus sodden with refuse, must convert the water of the well into a perfect cess-pool. With such a state of matters, can we wonder that foul ulcers and inveterate cutaneous diseases prevail on this coast, or that the population are so subject to intestinal worms?

I passed through one of these villages during the night; the foul gases which arose from these abominable deposits, some of which had been dragged from their shallow beds by jackals and dogs, tainted the air above to a most pernicious extent.

As a general sanitary rule, it ought to be the aim of the legislature to diminish to a minimum the amount of putrifiable matter which is brought

SERIES III. Section XIV.

into the centre of a densely populated town, and in a case like that under review, the prejudices of a few should not, I conceive, be for a moment considered where the safety of the community at large is concerned. As observed by Mr. Robinson the Magistrate, " an Act prohibiting sepulture " within towns and villages, is the first step towards ameliorating the condi- " tion of the poor in this respect."

Movement of European troops by transit. Head Quarters 2nd European Regt. L. I.

On the third occasion of my visit to Trichinopoly in May, I had an opportunity of inspecting the Head Quarters of the 2nd European Regiment Light Infantry, which shortly before then reached that station from Burmah. Two of the temporary barracks were occupied by them, and two Companies were accommodated in thatched huts. The left wing and the families occupied the old barracks. The wing returned from Tonghoo, upon the whole in good health, and there were no serious cases under treatment. The Surgeon informed me that there was but little sickness there, and that for days together he had not a patient in hospital.

The men were landed at Negapatam, which is 100 miles from Trichinopoly. Here, on my recommendation, they were sent on to their destination without any pre-arrangement, by means of country carts and bullocks procured from the road side villages, intimation having been sent a few days previously to the native authorities that the means were wanted. The first night's stage was Tanjore, sixty miles, where a Camp was prepared for them, and the following night took them into Trichinopoly. Bullocks were posted at short intervals; about forty common village carts were employed, and two men were comfortably accommodated in each cart.

By this admirable arrangement about 500 men were transported at the hottest season of the year in less time, and at less cost to the State, than if they had marched the distance, accomplishing the journey with comfort to all parties and without a casualty, while cholera prevailed on the road, and at the very same time the disease was carrying off men marching to the same Regiment and station from Madras.

There was no difficulty in carrying out the transport arrangements on this occasion, nor were the parties whose bullocks and conveyances were used in any way inconvenienced. The bullocks were taken in most cases from the plough. At first they got over the ground at the rate of two miles an hour, but daily increased their speed up to six miles in the hour.

If a proper system of ambulance were established in the Army, there is no reason why it might not be used for the double purpose of transporting troops as well as sick, where expedition was required, or at seasons when it would be unsafe to march Europeans.

The system of moving troops by transit was first tried in this Presidency early this year, when, on account of disturbances in the North-West, large bodies of soldiers (from 2,000 to 3,000 I believe) were forwarded to destinations without a casualty from diseases incidental to the climate, and at a less cost to the State than by marching when the expenses of field equipments, batta, &c., are considered. SERIES III. SECTION XIV.

SECTION XV.

COIMBATORE.

The station of Coimbatore is twenty miles from Metapollium, the village at the foot of the Ghaut passing up to Coonoor. The Kotagherry range of mountains which forms the southern side of the triangular plateau of the Neilgherries lies within this district; there are also the Palghaut and Annamallay hills, the altitude of the highest portion of the latter, which possesses considerable table-land on its summit, is said to be equal to the station of Ootacamund. In the northern part of the district is the Cauvery chain extending eastward from the Neilgherries about twenty-five miles from Coimbatore. At Palghaut there is an opening in the chain of mountains, twenty miles in breadth, through which the west wind sweeps with force, so soon as the monsoon sets in on the Malabar Coast; thus exerting an agreeable influence over the district. SECTION XIV.

The town and station of Coimbatore is 1,483, and the district generally 900 feet, above the sea, so that if the theory of Dr. Black be just, that for every 200 feet of elevation we may reckon one degree of reduced temperature, it ought to have a great advantage in this respect over those stations that lie lower and nearer the ocean.

The average daily sick treated in the Coimbatore Dispensary for the year 1856-57, was sixty, fevers and affections of the stomach and bowels being the prevailing diseases. The Dispensary was established in 1850. In that year 289 sick were treated; in 1857 those who sought for relief numbered 6,462. Civil Dispensary.

The hospital is capable of accommodating twenty-six males and ten females; the building set apart for the latter is a wretched place, and utterly unsuited for the purpose to which it is applied.

There are two Companies of the 21st Regiment Native Infantry stationed here. The men are very healthy. Detachment 21st Regiment N. I.

In the jail there were 432 prisoners, and thirteen sick. The accommodation for the prisoners in jail was very cramped, and a high wall enclosed the cells within fourteen feet of them. In 1855, when the jail contained 316 prisoners, the Medical Officer reported that the proportion of cubic feet of air to each prisoner varied according to the extent of their respective cells from 245 to 457. With the present number of prisoners, the proportion throughout does not exceed 250 cubic feet, and there is, moreover, little or no ventilation.

I may here mention, that in all newly constructed hospitals and jails, the floors should have glazed instead of porous tiles, when tiles are used. In some of the public buildings which I visited, the custom was merely to sweep the floor, which was done generally very imperfectly. In others, the floors were covered over with white-wash, which did little more than conceal the dirt, while in others, the floors were washed. The porous tiles thus imbibe and retain moisture, which is objectionable. Glazed tiles would obviate all this.

SERIES No. 4.

CENTRE DIVISION.

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SERIES No. IV.

Centre Division.

SECTION I.

Salem.

The station of Salem is 1,070 feet above the sea, and about 100 miles nearly due west from Cuddalore. It lies at the lowest part of a saucer shaped valley, seven miles in width, formed by the Shevaroy Hills to the north, and numerous conical shaped solitary hills to the south and east. To the west the country is open. The Cauvery river passes through and separates the Salem from the Coimbatore district. Native carbonate of magnesia is found in large quantities five miles west of Salem. It is said to form a durable cement, which hardens under water. The Railway passes close to the town of Salem. SERIES IV. Section I.

The building used for a Civil Dispensary is well raised and ventilated. Like similar establishments elsewhere it is much resorted to. Cholera and intermittent fever are endemic at this station for many years, more especially in March, April and May; at this period the numerous tanks and extensive rice grounds in the vicinity are becoming dried up, a condition of the soil admitted to be favorable to the development of malaria. But the sanitary state of the station is now improving under the careful supervision of a Sanitary Committee, who have drained the streets, and daily remove the filth as it accumulates. Civil Dispensary.

The prisoners at this Zillah are at present in temporary buildings. A new jail on the solitary confinement principle is in course of erection. It is in separate blocks, so constructed that the one neither looks into, nor does it impede the current of air from passing to the other. The blocks are to be six in number, three consisting of twenty-seven cells each, and three of twenty-one, making altogether 144 cells. The length and height of a cell is twelve feet, and the breadth seven feet, having a verandah in front. It is proposed to have a tower or centre building, the lower part for Jail.

SERIES IV. SECTION I.

the accomodation of the Guard, and the upper for the Jailer. Only prisoners under sentence for short terms are to be confined in these cells. The jail is nearly three miles from Salem, an inconvenient arrangement for the Medical Officer.

Opposite to an iron barred-door moving on a pivot in the centre, the pallet of the prisoner is to be placed, and under it is an aperture for the admission of air from the back of the building. But I could not learn that it was intended to have roof ventilation, which it decidedly ought to possess in order to produce a circulation of air through the cell. Moreover, there would be danger, I fear, in exposing the prisoner night and day especially during the monsoon opposite his barred door.

Native Infantry Hospital.

There are 250 men of a Detail of the 1st Native Veteran Battalion here. They occupy lines one mile south of Salem, where a very good hospital has been erected. But hitherto it has remained unoccupied, there being no Medical Subordinate to do the duty, and the distance is too great for the Dispensary Dresser to proceed there.

SECTION II.

VELLORE.

SECTION II. Garrison Hospl.

The station of Vellore is eighty miles west of Madras. Within the Fort, which is well raised, capacious and surrounded by a broad ditch, is the Garrison Hospital. About a mile from the fort running in an easterly direction are broken and rocky hills. The Garrison Hospital consists of one long ward of good breadth and height, but wanting in roof ventilation. The sick treated here are European pensioners, Veterans and effective men attached to the Magazine, some Golundauze and convicts. I found thirty-three in hospital; the building is only capable of containing eighteen. Some of the sick were accommodated in out-buildings, very unsuited for them. The privy attached to the Garrison Hospital, Vellore, is so close to the large ward that the smell arising from it is frequently very offensive. It is also insufficient in point of size. I would, therefore, suggest that a large privy be erected on an available piece of ground, just outside the hospital walls behind the cook-room and close to the ramparts where a drain already exists.

Jail.

The convicts number 180. They are accommodated in long narrow wards under the ramparts, clean, but very badly ventilated. Thirteen on the sick list with trifling ailments.

SERIES IV. SECTION II.

Civil Dispensary.

The Civil Dispensary receives support from a local charitable fund denominated the Lungar Khana; no expense to the State is incurred thereby, beyond the cost of medicines; sick are received for treatment from any quarter.

The daily average of sick treated in the Dispensary in 1854, being the year in which it was formed was 40
Do. do. in 1855 was 82
Do. do. in 1856 was 97
Do. do. in 1857 was 80
and from 1st January to 30th April 1858 the average has been 100.

18th Regt. N. I.

The strength of the 18th Regiment Native Infantry is 694, and there are the large number of fifty-seven in hospital. The men returned from Burmah twenty months since, and had been in Goomsoor prior to proceeding thither. They are, as a body, weak and sickly looking, much more so than they ought to be after so long a sojourn at Vellore. When I resided at this station twenty years ago, it was not surpassed in salubrity by any in the Carnatic, and I frequently had my hospital empty. I was forcibly struck with the change. On minute inquiry I learn that not only has fever, but that cholera has also become endemic in the station of Vellore. At present the prevailing disease is fever, and its concomitant rheumatism.

On proceeding to inquire into the probable cause of this unfortunate change in one of our most desirable stations, I found that the place had much overgrown in extent, with the increase in the population, and that many houses had sprung up within the Military Cantonment, the area of which continued the same. Circulation of air was thus impeded, and concealed filth accumulated. Around the hospital for the Regiment, the houses have so encroached that they reach to within a few feet of it, the hospital itself being about the worst I have seen. I cannot do better than forward the correspondence and urge on the Director General to use his influence to carry out the judicious measures proposed, and also to cause all filth and low brushwood to be cleared away, and the area of the Cantonment to be extended if possible.

Recruiting Depot.

There were 578 of the Native Infantry Recruiting Depôt, and fourteen sick. The recruits are transferred to Regiments from time to time, and none of them a long resident at Vellore.

SERIES IV.
SECTION III.

SECTION III.

CHITTOOR.

The station of Chittoor is enclosed, except to the east, by low barren hills. It is said to be 1,100 feet above the sea level. Palmanair which is at the top of the table-land passing on to Mysore, lies twenty-four miles west of Chittoor, and has hitherto been a favorite place of retreat during the hot months of the year. It is 2,312 feet above the marine surface. Here the temperature averages seven to eight degrees lower than in the plains, and although the sun is powerful during the day, the nights and mornings are always cool.

Civil Dispensary.

The Civil Dispensary of Chittoor is freely resorted to. One thousand seven hundred and eleven individuals sought relief in 1850, the year of its formation; during last year 7,142 sick were prescribed for; the prevailing diseases being fevers and bowel disorders. The building is not well adapted for sick. The women's ward is a very wretched place. Neither of the buildings is ventilated, and some of the wards allotted for prisoners are crowded inordinately.

Hospl. Detacht. 1st N. V. B.

In the Detachment of the 1st Native Veteran Battalion, there are many men who are utterly unfit for further service, from age and infirmity. I found this to be the case in other Detachments of this Corps. Very many men are borne on the strength as being fit for Garrison duty, who are only a burthen on the State and ought to be pensioned.*

Jail Hospital.

In the jail there were 381 prisoners and eleven sick. The cells of this jail are wide, lofty, and freely ventilated by means of a false roof; there was consequently not that fetid and close odour and feeling of oppression conveyed to the senses, which always exists in low-roofed and ill-ventilated jails.

Defects in Jails and Jail Hospls.

As this is the last of the district jails and hospitals which I propose to deal with on the present occasion, I sum up under separate heads a few observations, which are applicable to almost all that have come under my observation.

1st.—They are overcrowded.

2nd.—They are badly ventilated or not ventilated at all.

3rd.—The high wall encircling the cells, is in too close proximity to these. It prevents the free passage of pure air, and it gives off a large amount of reflected heat.

4th.—The latrines are badly constructed, and in many cases too close to the walls.

* The Veteran Battalions were disbanded in 18?0.

5th.—When each man retires for the night to occupy his place, which in length and breadth is little more than will enable him to lie down, he takes with him a small *chatty* into which he passes not only his urine, but if necessary, his feces also, and this is not removed till morning, an offensive and obnoxious arrangement.

6th.—The buildings are usually infested with vermin, the necessary result of over-crowding and bad ventilation.

To rectify these objections, improvements can, without difficulty, be introduced into many of our present jails, and in all new structures hygienic considerations ought to have every consideration.

SECTION IV.

ARCOT.

SECTION IV.

3rd Extra Regiment N. I.

Arcot was formerly the Mahomedan capital in the Carnatic. The Military Cantonment is placed on an open, bleak plain, with here and there bare solitary hills. About thirty years since, the force stationed at Arcot was one European and two Native Cavalry Regiments. Now it is unoccupied, save by the European recruits from England and European and Native non-effectives and invalids. The 3rd Extra Regiment Native Infantry was also temporarily stationed here on the occasion of my visit, but it has since been removed.

European Infantry Depot.

The European Infantry Depôt at Arcot occupy the buildings erected for the Dragoons in former days. These public buildings, especially the hospital, are well constructed, large and airy; but the sites of some of them have been selected, without regard to sanitary considerations. Cholera of a low and fatal type may be said to be endemic in the native town, and, when it extends to Cantonment, it is a remarkable fact that it first seizes on men who chance to occupy one end of the lower range of barracks, used now only as a refectory—the men having a natural dislike to sleep there.

The heat of Arcot is very oppressive. I have been stationed there for a couple of years, and I have not in any other Military Cantonment experienced in myself, or in my attendance on others, equal nervous exhaustion with inability to exertion, loss of appetite, and prostration of strength.

All European drafts from England for the Company's Army are in the first instance sent ~~to Arcot~~. Many sick and wounded invalids are

SERIES IV. Section IV.

also placed at this Depôt until finally disposed of. I made a long and thorough examination of the men in hospital as well as those in barracks, and found it difficult to distinguish the young recruit only a few months in the country, from the older soldier, who was here as an invalid; except that the latter was more bronzed by exposure, both were equally anæmic and sickly in appearance; and as I have already reported to the Director General, the dress which the men wore, added to the exhaustive effects of the climate. Padded cap covers, reaching well over the neck and sides of the head, and smockfrocks, should be substituted for the thin calico cap cover and scarlet shell jacket lined with flannel. If it be the intention of Government to retain Arcot as a permanent Depôt for Europeans, many sanitary improvements are necessary both in the position, structure and conveniences of the public buildings there, so as to adapt them to the requirements of the age; but I trust it is not so. On a future occasion (see Section Shevaroy Hills),it is my intention to urge the transfer of the Depôt to certain mountain ranges, which a few months hence, when Railway communication has been opened, will be brought to within eight hours' journey from Madras.

I will for the present, therefore, only urge attention to the state of the privies, especially that attached to the building now used as a hospital, and recommend that an apperture be made in the roof of each; that punkahs be placed in the barracks and in the hospital; that the proper hospital building be given over to the sick, it being used now as a barrack; and finally, that an effort be made to occupy the minds of men by providing them with a library composed of the cheap literature of the day.

Depot 2nd Native Veteran Battalion.

The head-quarters of the 2nd Native Veteran Battalion is stationed at Arcot, and numbers only 150 men. One case of small-pox was under treatment. The numercial strength of the 3rd Extra Regiment was 1,075, with twenty in hospital; six of these were small-pox cases, the others were of little importance. Besides these there were also at this station a few convicts and sick Details of Cavalry Regiments on service.

Civil Hospital, Raneepett.

The Civil Hospital and Dispensary at Raneepett, three miles from Arcot, was opened in 1855. It is also supported by the surplus Lunger Khana funds; medicine being granted by Government on a second class indent. There is an admirable building set apart for the Dispensary, and the number of applicants for relief has increased fourfold since it was first opened.

SECTION V.

Poonamallee.

The Poonamallee Depôt of Her Majesty's troops is situated thirteen miles from the Presidency. As at Arcot the drafts from England to Regiments in this Presidency, invalids and unfits from up-country are received here. Depot for H.M.'s Troops.

The barracks of the men are wretched, unsuited for the plains of India. There are 395 European soldiers at the Depôt, and in consequence of some families of Her Majesty's Regiments occupying a portion of the barracks, the space left for them is very contracted. They are in fact crowded to an intolerable extent. In the enclosed verandah and in the body of the building, the men lie on boards and trussels with barely space to pass between each.

Their clothing and kit are placed over their heads, and they partake of their meals where they lie. The barracks are almost level with the ground. Their side walls are but ten feet high, and the pent-tiled roof barely five above this. The doors are solid, if closed no fresh air could enter, and there is no egress for the foul air above.

The hospital is placed within the fort, and it is even more objectionable than the barracks. It is lower in the roof. Great buttresses have been erected at short distances both outside and inside the verandah; centre walls have been raised inside the sick wards to keep the building from tumbling down. This ward is only sixteen feet in breadth; it slopes from the centre to the sides (probably from the sinking of the walls) to such an extent, that the legs of the sick-men's cots at the head, are obliged to be elevated by bricks so as to place them on a level with the floor on which the foot part rests. It is utterly devoid of roof ventilation. The place on which the building stands is so encircled by the fort walls and out-houses attached to the hospital that the sea-breeze cannot reach it; and finally the ditch surrounding the fort is shallow and over-grown with weeds, and, the Medical Officer in charge informed me, it becomes in the dry season an offensive swamp, giving off mephitic exhalations.

If it be desirable to remove the Depôt, for the Honorable Company's European troops, from Arcot to a more favorable situation, it becomes an actual necessity, that for Her Majesty's Troops in India should find a more favorable locality than Poonamallee. I have already stated my reasons for recommending the Shevaroy Hills for this purpose.

In the small Detachment of the 2nd Native Veteran Battalion at Poonamallee, only one old infirm man was on the sick list. Detachment 2nd Native Veteran Battalion.

SERIES IV.
Section VI.

SECTION VI.

Palaveram.

Native Infantry Depot Hospital.

Palaveram, originally denominated the Presidency Cantonment, lies twelve miles from Madras and three miles beyond St. Thomas' Mount. The troops intended to garrison Madras were formerly stationed here, now it is the chief Depôt for all sick Details from Regiments on service beyond sea and out of the Presidency.

The number of invalids at this station always varies; 1,481 were received during the official year 1857-58. On the occasion of my visit 108 only were on the Surgeon's list. Fever and its terminations, viz., debility and rheumatism, diarrhœa, beriberi, ulcers and atrophy, formed the majority of the ailments of the men. Cholera has never been known to visit this place epidemically.

On the arrival of sick Details, a Committee, presided over by the Superintending Surgeon of the division, meets whenever a man is examined, and sick leave to their native village is at once granted to those who require it; the others remain in hospital, or on the convalescent list, for treatment or observation. After the expiry of a short period, those who have not improved appear again before the Committee, and sick leave is granted to them also.

The orders from the head-quarters direct that no man is to be removed from the effective list, either to the invalid or pension establishment, or discharged the service as an unfit, unless he has had, in the first instance, a tour of sick leave to his native country. This order might, I conceive, be modified with advantage, as many men arrive at the Depôt with incurable diseases or disabled by wounds or loss of a limb, which cannot derive any benefit from change of air, such cases ought, I conceive, to be finally decided on at once. The man thus unfitted for service would at once be removed from the effective establishment, there would be a saving to the State, and in the majority of cases the desire of the invalid would be met, for he would thereby be saved a double journey. No individual is permitted to rejoin his Regiment on service until he has been six months at the Depôt, and not even then, unless the Committee of Medical Officers pronounce him fit for active service.

When men are recommended for pension, a considerable delay usually takes place, before the order sanctioning their pension is received, as the following cases extracted from the books, at random, will show.

SERIES IV. SECTION VI.

Rank and Names.		Date of Committee recommending pension.	Decision of Government.
Private...	Yenkenah ...	28th April 1857.	Pensioned 31st Dec. 1857.
Do.	Sheik Ismail..	14th Sept. 1857.	Not yet decided on, June 1858.

Pegu Police Battalion.

The Pegu Police Corps has not yet received a hospital establishment; there are no sick amongst those stationed at Palaveram, the greater number being on duty at Madras.

SECTION VII.

Saint Thomas' Mount.

Section VII. Hospital Royal Artillery. Hospital Honorable Company's Artillery.

Saint Thomas' Mount is the head-quarters of the Madras Artillery. The climate resembles that of Madras, but from the proximity of the station to the hill from which it derives its name, the temperature exceeds that of Madras generally two degrees.

There are admirable barracks at this station for 700 European soldiers. They run in a direct line north and south, and are freely open to the influence of the sea-breeze.

The Cantonment Hospital is eligibly situated, and is one of the best in the Presidency. It is elevated six feet from the ground, and thus enjoys a free circulation of air though surrounded by an outer wall. The lower story of the building has two centre wards and an enclosed verandah all round. The upper story has two spacious wards with terraced roof. There are also spare closets for cases which require seclusion. The Surgery, Store rooms and adjoining buildings present every convenience that can be desired, and there are separate wards for women and children.

The Horse Artillery and Golundauze hospitals are less commodious, but they are both superior to any of the hospitals at other stations. There is accommodation in both of these for twenty patients, and they are tolerably ventilated.

The Artillery stationed at the Mount are the H. Troop Royal Horse Artillery; the 5th Company 1st Battalion Royal Artillery; the 1st Battalion and Details Madras Artillery. Of the two former there are thirty-

SERIES IV. SECTION VII.

seven, and of the latter twenty-six in hospital. Fever of a continued form has been endemic for some months, chiefly amongst the Royal Artillery at this station. When first it appeared it assumed typhoid symptoms with considerable gastric derangement; now it is much more mild, seldom resists treatment more than two or three days, and frequently terminates in a pustular eruption, not unlike chicken-pox.

The Medical Officer in charge can assign no distinct cau e for the prevalence of the malady, which has been chiefly confined to the Royal Artillery, save that they suffered from a somewhat similar fever at Sheerness just before embarking. In company with the Superintending Surgeon, I carefully examined the men's barracks and places adjoining them. We found that natives resort to the face of the hill behind the barracks, for the purposes of nature, and that an open offensive drain exists behind the hospital. These points were brought to the notice of the Brigadier Commanding the Cantonment, with the view to their removal.

Golundauze 5th Battalion Artillery.

The men of the Native Artillery are in excellent health. The convicts at Guindy number sixty-six, and there are five sick. Diarrhœa is the prevailing disease amongst them.

SECTION VIII.

CHINGLEPUT.

SECTION VIII.

This station is thirty-five miles south-west of Madras, it is the capital of the Collectorate of the same name, and is placed in a valley near a fine artificial lake; small rocky hills lie to the south of the fort; low jungle at some distance, and rich cultivation immediately around it.

Detachment Native Veteran Battalion and Jail Hospital.

The hospital for the Detachment Native Veterans and prisoners, is situated within the fort. It consists of three wards and a Dispensary. It is quite unsuited for the reception of sick, being situated too low, surrounded by walls and other buildings. It is shut in on the rear, and is entirely without roof ventilation. The sick sleep on the floors, which are broken and uneven. The walls are dirty, and the building altogether out of repair and swarms with vermin. I recommend that it be pulled down and suitable building erected on an open and elevated spot, which was fixed on by Mr. Dowdeswell the Judge, and myself. On

the date of my visit there were 285 prisoners in jail, and twelve sick in hospital.

Civil Dispensary.

The daily average sick treated in the Civil Dispensary for the year 1856 was fourteen. The number of out-patients being sixty-nine per diem. The prevailing diseases are diarrhœa, skin and venereal affections. There is accommodation for thirty patients in hospital, but severe Cases only are admitted. The building is well elevated and has free roof ventilation.

SECTION IX.

CUDDALORE.

SECTION IX.

The town of Cuddalore, the capital of South Arcot, is situated on the coast 112 miles south of Madras. The site of the town is not more than five feet above the level of the sea. The soil around is a mixture of clay and sand. There are patches of rich cultivation, but no jungle or hills in the neighbourhood. The climate is very equable, but relaxing in its effects, but is considered favorable to convalescence from acute attacks.

It is a remarkable fact that at Pondicherry a few miles to the east of this station, the diseases of India, dysentery and hepatic affections in their acute forms, are almost entirely unknown amongst the French. This exemption from diseases so fatal to English residents in India, may be attributed to the admirable system of drainage and attention to sanitary details in the town, which is a model of cleanliness, as well as to the different modes of living of its inhabitants. Their diet is chiefly vegetables and curries, and their drink the light wines of France, while ours consists of large quantities of animal food, malt and strong liquors.

European and Native Depot Hospitals.

For many years Cuddalore has been the Depôt for pensioners and invalids from all parts of the Presidency. As the final resting place for the old and worn-out soldiers, I expected to find here every adaptation in position and in the construction of the buildings, calculated to promote health and to advance recovery from sickness. But the very opposite to this is the case. Like the majority of our hospitals, that at this Invalid Depôt appears to have been constructed with but one object in view, the saving of money in the first instance; ventilation and other simple essentials seem to have been hardly thought of. The hospital and European

SERIES IV. SECTION IX.

pensioners' lines are situated close on the muddy bank of a river or swamp forming an inlet for the sea, which is daily flooded and emits disagreeable odours, which must be productive of injurious consequences.

Calculated for a period of nine years, the admissions into hospital amongst European invalids averaged 60 per cent. on the strength, and the deaths 10 per cent on the number treated. A small building is rented by Government as a hospital for Europeans, close to it is a wretched room eight feet in height, the floor being level with the surrounding ground for native sick soldiers, both being utterly devoid of roof ventilation.

Jail Hospital.

The jail hospital is an old bomb-proof warehouse, used in former days for goods; the floor is below the level of the soil, it has two doors and windows for the ingress of fresh air, while its only egress is by two small oval openings in the wall, one passing away into an adjoining cell, the dormitory for fifty healthy prisoners,—into these hospital wards men afflicted with small-pox, cholera, or other diseases are placed. From the construction of the building and the mode in which ventilation has been attempted, the contaminated atmosphere as it ascends has no means of escape, save into the above mentioned cell.

The means for remedying this very objectionable state of matters are within the reach of Government at a very small cost. The apartments over the prisoners' cells and the hospital, now occupied by the Moonsiff and Sudder Ameen's Courts, are spacious and lofty, and elevated some thirty feet from the ground. With a few alterations this might be admirably adapted as a hospital for European and native soldiers and for prisoners. Access can be made to the wards set apart for the two former from without the jail compound, and for the prisoners from within, a free circulation of air can with ease be established. One convenient Dispensary for the three hospitals would be available; the Surgeon, the patient, and the Medical Subordinate would all equally derive advantage from the change, and we should be making the most of what is at best, a bad locality. Both the Session Judge and the Medical Officer were of the same opinion with me. Whatever improvements may therefore be decided on, the superintendence of these should be entrusted to them.

Civil Dispensary.

This most useful establishment is situated about four miles from the Depôt hospital. Like most of the most recently built hospitals, this building has been constructed with a view to the comfort of the sick. The average daily number of sick in hospital for the year ending

1856 was twenty, and that of out-patients, ninety-four. The prevailing diseases are affections of the stomach and bowels, cutaneous, syphilitic and rheumatic affections. The large number of 8,550 patients were medically treated in 1856, and the numbers are annually augmenting. Until lately a Surgeon held the appointment of Depôt Surgeon at Cuddalore on terms nearly equal to that of a Garrison Surgeon: now the Assistant Surgeon attached to the Zillah does the same duty without receiving any extra allowance. The distance between the Dispensary and Depôt hospital is close on four miles. When epidemics prevail, or when any case of importance is under treatment, he has to pay repeated visits to those hospitals: his house being about midway between the two. I beg to recommend that palankeen allowance be specially granted to him, to aid him in keeping up the extra establishment necessary for the efficient discharge of his duties. The medicines are reported to be abundant, and classified as directed. The Surgical instruments are in good order, and altogether the regulations of the service are carried out.

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PLAN
of
MADRAS
and its Environs
Scale one Mile
Furlongs
Fort St. George
Peoples Park
Penitentiary
Chepauk Palace
Marine Villa
Promenade
Saluting Battery
Wallajah Bridge
Island
Elphinstone Bridge
Quibble Island
Mylapore Tank
Nungumbaukum Tank
Spur Tank
Cotton's Canal
Ennore Canal
Perambore
Veysurbaudy
Vepery
Egmore
Chintadrepett
Triplicane
Royapett
Teynampett
Alwarpett
Mambalum
Sydapett
Botanical Garden
Lunatic Asylum
St. Andrews Ch.
St. Georges Cathedral
St. Thome Cathedral
Government Gardens
Tondiarpett
Royapooram
Kasimode
Powder Mills
Gunpowder Magazine
Salt Depot
Basin Bridge
Casa Major
Chief Engineer D.P.W.
Colonel
Gov. Lith. Press D.P.W. Chepauk
Supt. & Manager

SERIES No. V.

PRESIDENCY DIVISION.

SERIES V.
Medical topography of Madras.

The maritime city of Madras is situated on the Coromandel Coast in latitude 13° 4' north, and longitude 18° 14' east. The population embracing an area of thirty square miles, is estimated at 800,000, that of the city and suburbs, within three miles around Fort Saint George, and enclosing a space of ten or twelve miles in circumference, comprising the towns ot Royapooram, Vepery, Chintadrepett, Poodoopett, Egmore, Triplicane, Royapettah and Saint Thomé, has a population of about 400,000. The citadel of Fort Saint George is on the beach, surrounded by a plain, on the north side of which is the Black Town, whose population exceeds 100,000 persons. The site of this city formed the first territorial acquisition by the British in India, permission to erect a fort having been obtained in 1639.

It is badly situated for a commercial capital having an open roadstead, indifferent anchorage, and surf-beaten shore. It stands on level ground, part of Black Town being only six inches above the level of the sea at spring tides. On the west and south sides of the fort, separated from Black Town by the river Cooum, is Choultry Plain, on which are detached houses, occupied by the European community. The Mercantile Offices are placed on the beach, and those of Government chiefly in the fort.

Water.

Madras has long been famed for the purity and good quality of the drinking water procured from the Seven Wells, situated close to the north of Black Town. Two reservoirs are daily filled from these wells by means of pipes. One midway between the wells and the fort, and the other in the citadel. The shipping and all the inhabitants are supplied from this source. The purity of this water appears to depend on its being filtered through a bed of fine sand. In digging wells, if stratum of sand is passed, the water obtained is of an inferior quality. The latest analysis of this water discloses an amount of impurity in the presence of organic matter which in previous years did not exist. This

SERIES V. is supposed to be owing to the very imperfect drainage of the neighbourhood and to the surface filth which falls in from above.

Drainage. Nothing can be more imperfect, more offensive, or more destructive to health than the system of drainage throughout the Presidency division. In the native towns above enumerated, all of which are densely populated, the only attempt at drainage is an open sewer leading to the river. The surface channels are usually the same breadth at the bottom as at the top. They should be constructed in a oval shape below, to prevent the dirt clinging to the edges. They are placed in the principal streets; in them the filth from the houses and the surface scourings intermingle, occasioning a most obnoxious slimy water, which is difficult of removal, and speedily clogs the drains. The effluvia arising from these sewers is a continual source of complaint.

Public latrines. The erection of public latrines in and around Madras, during the past few years, and the enforcement of stringent Police rules connected with these, has not only been conducive to public health, but also to the comfort of the people. Much, however, is still required to be done. Every convenient spot is resorted to by natives for the purposes of nature, there are hillocks of human ordure, the accumulations of the contents of scavengers' carts, contiguous to crowded localities, inhabited by half-fed squalid wretches, amongst whom disease is always present. These heaps are placed in the course of the prevailing sea-breeze as it passes on to our populous suburbs.

Climate. The prevailing winds at the Presidency are south-west from April till October, and north-east from the middle of October till the same period in March. The changes are usually ushered in with storms, but the violence of the monsoons are chiefly expended on north-east and south-west coasts respectively, ere they reach Madras. Besides these annual changes during the hot months of the year, there is usually a diurnal change from the hot land to the refreshing sea-breeze.

Temperature. In January and February, the mean temperature is... 76°
In March and April.... ... ... 85°
In May, June and July, land and sea-breeze... ...... 88°
In August and September, cloudy and oppressive... ... 84°
In October, November and December, cool and damp... 80°
The annual fall of rain in Madras averages 30 inches.

Salubrity. It is in the months of August and September when, with the first fall of rain, the surface filth becomes dissolved, and when the night-soil which had been concealed by the scavengers and slightly covered under every

hedge-row, has been exposed, that cholera which lurks throughout the year amongst the purlieus of Choolay and Black Town becomes more or less epidemic. Typhoid fever (using the term as it is now understood as a malady arising from an animal poison) has of late years been noticed to prevail about the same time, and the proportion of deaths has been high. Bowel disorders are also common. These are incontestible proofs of the existence of a malarious poison emanating from defective drainage and the absence of proper municipal arrangements. Save at these periods, the community at Madras are tolerably healthy. During the past few years night punkahs have come into general use, and ice is largely consumed. Both of which circumstances conduce indirectly to the preservation of health. I strongly recommend that the hedge-rows be pruned and all underwood removed. The large trees would then conduce to the salubrity of the place, by affording shade and protection from the clouds of dust arising from the roads and sandy soil without obstructing the sea-breeze.

Distribution of Medical Duties.

The medical duties at the Presidency are distributed as follows :—

I. The town and suburbs are divided into four Districts, each under the professional charge of a Surgeon or Assistant Surgeon.

First District comprehends Tondiarpett, Corookoopettah, Washermanpettah, Uttapaulium, Royapooram and Black Town. The dependent duties being Jails, Native Infirmary, Idiot Asylum, Leper Hospital and Emigration.

Second District includes Vaysurpaudy, Perambore, Veeranatotum, Pursewaukum, Choolay, Vepery, New Town and Kilpauk, all to the north of the Poonamallee road. The dependent duties being Vepery Dispensary, Female Asylum, Powder Mills, and Gun Carriage Manufactory.

Third District takes in Chetput, Egmore, Chintadrepett, Poodoopett, Nungumbaukum, Nursingapoorum and part of Poodoopaukum, embracing the area from the Poonamallee road southwards, east of the Mount road by Mowbray's road as far as D'Monte's house on the Adyar, with charge of Male Asylum.

Fourth District comprehends Adyar, Alverpett, Mylapoor, Tannampett, Royapettah, part of Poodoopaukum, Kistnampett, Triplicane and Chepauk along the southern part of the Cooum, with charge of the Triplicane Dispensary and Police.

II. The Medical Storekeeper, who is also in charge of the Lunatic Asylum.

SERIES V.

III. The Superintendent of the Eye Infirmary.
IV. The Superintendent of the Lying-in-Hospital.
V. The Physician to the General Hospital.
VI. The Surgeon of the General Hospital.
VII. The Garrison Surgeon, Fort Saint George.
VIII. The Garrison Assistant Surgeon, Fort Saint George.

SECTION I.

First District.

Section I. First District—Topography of the District.

The Black Town is bounded on the east by the sea, on the north and west by a strong brick-wall, and on the south by Fort Saint George and its glacis. The town extends about a mile along the beach, and contains amongst other buildings the Supreme Court House, the Marine Board, the Commissary General's Office, the Madras and other Banks, the Offices of the Mercantile community, and other handsome buildings. Immediately to the north of the city is the Railway Terminus. The town is intersected by three principal streets, running due north and south. The centre of Popham's Broadway contains the principal European shops, the Market, the Chapels, the Church, Weslyan and London Mission Societies, the Supreme Court Jail, the Male and Female Orphan Schools, &c. The minor streets are very numerous, many of them extremely narrow and ill-ventilated. The structure of the buildings are very variable; those of the natives are crowded together and interfere with proper ventilation. The lowest part of the town is its centre, and may be described as a valley running in the direction of Popham's Broadway with slight rising ground on each side.

Drains.

In the centre of this valley the main drain is situated, into which all the minor drains empty themselves. Much difficulty must under all circumstances be experienced in draining the town, owing to the slight elevation it possesses above high-water mark. There are three main drains by which the sewage of the populous town is conveyed, and the fall from the source of each to the sea does not exceed four feet. The great error in the construction of the drainage is, that the surface drains are too deep and not sufficiently elliptical in form, and that they discharge their contents direct into the large conduit, instead of through a grated passage permitting a large quantity of solid surface filth to

descend into the latter and clog up the conduit, which a grating would prevent.

Water.

The town is amply supplied with good water from the Seven Wells compound, or enclosure already adverted to, situated within the wall and to the north of the town. The purity of the water in this locality seems to depend upon the extreme purity of a bed of sand in which it is found. The sand consists chiefly of quartz, and is perfectly white in color. It is much used in combination with shell lime for all fine work, and to it we owe the beauty of the buildings so peculiar to Madras. The space in which this sand is found is very limited, and runs in a line south from the Pulicat lake to the enclosure, where the water works are placed and in which it terminates; its breadth in no place exceeds a few hundred yards; in some places it is found on the surface, in others it is covered with soil (red clay and sand) to a considerable depth, and the depth of the bed varies from ten to fifteen feet. If this stratum of sand is passed, the water is of an inferior description and not unfrequently brackish.

Absence of conservancy and imperfect drainage, a fertile source of disease:

The whole of the refuse from the town is carted to a spot on the north of the Leper Hospital. I examined this spot with the District Surgeon, who has repeatedly represented the nuisance to the Municipal Commissioners. I beg to urge the attention of the Director General to the necessity of immediate interference in this matter, and also in the districts of Royapoorum, Kassepoor and Tondiarpett, and in the Fishermen's village in the same neighbourhood. The stench and filth around there is something dreadful, and it pollutes the sea-breeze before it reaches the better class of houses inhabited by respectable Railway people and others connected with the Government Offices. A public necessary on the beach, and a guard of Police to enforce cleanliness, are much wanted here. The defective drainage of Black Town, and consequent offensiveness, coupled with the other deficient hygienic measures detailed above, render the inhabitants prone to disease; so we find that a low form of fever and cholera is always endemic in this locality, and that the mortality is very large. In no part of my inspection tour, and I have now visited nearly every station in the Presidency, had I seen so many sources of disease brought together in a limited space as at Madras. While curative measures are to be found in abundance, the preventive are too much neglected. Official interference is urgently required to bring about a favorable change in the state of the public health in this populous

SERIES V. SECTION I.

district. The whole system of drainage must be improved. All the small drains should be made to discharge their sewage into the northern main drain near the fort, or into the southern main, near the Railway, and the means secured for flushing the whole and emptying them at their *debouchure* into the sea; and, in addition to the other measures recommended, I would urge the clearing of over-crowded localities, by opening out new, and widening old streets so as to admit of free passage for the sea-breeze throughout the town.

Monegar Choultry.

The Monegar Choultry, Leper Hospital, Town Dispensary and Native Infirmary are all adjoining. They are in part supported by Government and in part by the public. The Monegar Choultry is a poor house, in which the old and infirm of both sexes find a comfortable asylum. It occupies three sides of a square, and consists of a long range of apartments, all requiring roof ventilation.

Idiot Asylum.

The Idiot Asylum contains fifty-nine males and thirty-two females. They are usually very tractable and unoffending, restraint being hardly ever necessary. They are made to work daily in a garden adjoining their premises, but seem to take no interest in the occupation. Ventilation is required in their cells also.

Leper Hospital.

The Leper Hospital at present protects nineteen Indo-Britons and forty natives. They are too much crowded; but an additional space is now in course of erection for them. Their present wards are defective in roof ventilation; this should be remedied, and ventilators should certainly be introduced into the men's wards now in course of erection. The drainage is defective within this hospital compound and in the neighbourhood. During the north-east monsoon, the sewage flows back into the premises. Instead of raising a high wall around the new buildings now being constructed, I recommend the erection of a dwarf wall surmounted by a rail supported on pillars.

Black Town Dispensary and Native Infirmary.

The Black Town Dispensary and the Native Infirmary occupy one building; these establishments are very much resorted to. The families of parties belonging to the Arsenal, Gun Carriage and Bullet Manufactories, Warrant Officers, Uncovenanted Civil Servants, the Railway workmen, and the poor of the city are entitled to receive aid from the Medical Officer in charge of these establishments. On the morning of my inspection there were eighty-four sick in the Infirmary, and 141 received relief at the Dispensary. During a period of five years 1854 to 1858 inclusive, 59,748 have been treated at these establishments, giving an annual average of nearly 1,200.

The prevailing diseases are syphilis, fevers, and bowel disorders; of the former 370 were admitted on an average monthly; there was also a large number of rheumatic affections consequent on this disease, many of these admissions were females who rarely entered the hospital until they were forced to seek relief by the severity of their disease. The present District Surgeon, as well as his predecessor, are satisfied that the fevers in Black Town are entirely of a malarious origin, and that unless quinine be early resorted to the patient rapidly goes on from bad to worse. Dr. vanSomeren states, "I have found "the tincture of aconite all powerful in reducing both the intensity "and duration of the hot stage." Cholera is classed under affections of the bowels. I am informed that sporadic cases of this disease occur in the district throughout the year, and that it annually appears as an epidemic during the first fall of rain, when the surface filth, baked by the sun's rays for many months, is first liquified and then acted on by the solar heat. Surgical cases form a large number of the admissions, and frequent operations are necessary.

The building occupied as an Infirmary is radically defective in many respects. It covers a large space, and is not raised from the surrounding ground. It is thus always damp, and I observed it was infested with flies, and that it is not possible to keep its wards and passages clean and dry. I quite concur with the present as well as the former medical incumbents, who have urged the necessity of a new building to meet the exigencies of the people in this city, the wealthy part of whose population might possibly be induced to combine to supply what is so urgently wanted.

I learn from the Medical Officer that his annual supply of medicines does not meet his wants. An order was recently issued by the Director General, directing a sufficient supply of medicines to be sanctioned under the annual indent, so as to put a stop to the inconvenient and expensive system of frequent extra indents. The District Surgeon tells me that he acted up to these instructions in sending in his last annual requisition; but it was as usual curtailed, and this will render extra indents again necessary. There is a Vaccinator in the district, who carries out his duties under instructions from the Superintendent of vaccination. The District Surgeon can also claim his services.

There is a large accumulation of records in the above establishments; the majority are obsolete and worthless, such as Prescription books, copies of returns, &c., all of any value being in the Director

SERIES V. SECTION I.

General's Office. I recommend the destruction of these up to a recent date.

Black Town Salay Street Dispensary.

This Dispensary was established in 1857. Government liberally provide the medicines, and the native community the house and current expenses of the establishment. It is situated in the poorest and most populous part of Black Town, and during its existence up to this date, 27,957 sick have sought relief there. Diseases of the stomach and bowels, fevers and syphilitic affections form the large majority of the admissions. Of the latter there have been 511 treated, and nearly as many from rheumatic and other syphilitic complications. The Native Surgeon in charge is a very superior man ; he possesses the confidence of the community amongst whom he resides, doing a large amount of good. On the morning of my visit he administered to nearly 200 sick. He is much restricted in his exertions by the poor accommodation occupied as a Dispensary. But funds are being now collected from the native community to raise a building suited to the wants of the place, and to the position in native society, occupied by those who form the large majority of admission, *viz.*, high caste Brahmins, Chetties, Naidoos, Mudaliars, and Gentoos.

Supreme Court Jail. Justices' Jail.

The two first Jails on this list are situated in Black Town. These buildings were erected at a period when sanitary science received little consideration. The lower apartments in both more resemble dens adapted for wild animals, than dungeons for unfortunate human beings sentenced to incarceration for a series of years in a tropical climate. Some of the cells in the Supreme Court Jail do not exceed ten feet long by eight broad and eight high ; the only opening being the ponderous door, which, when closed, excludes air and light. Fortunately the number of prisoners confined is usually small, and to this circumstance it owes its freedom from disease. But if the time ever comes when it will be necessary to occupy it more generally, a pestilence must be the result. There is only one life prisoner there now. An European, another occupant of one of the cells, is sentenced to confinement for four years. There are in all six Europeans and twenty-six natives in this jail ; they all have a sickly anæmic look, and four out of the former are in hospital. Ventilation there is none in any part of the buildings, and one of the main drains of the town passes under the walls, the stench from which is at times abominable. The Justices' Jail is only now used as a lock-up house for the night, or for parties awaiting trial. As in the other, strength and security appear to have

been all that was desired when it was constructed; sanitary considerations do not appear to have been thought of.

Penitentiary.

The Penitentiary is a modern building, and is situated in an open locality without the walls on the banks of the Cooum river. There is free space on every side, and all within and without is kept in admirable order. The cells are secure and wholesome. Ventilation has been very generally attended to; the prisoners have a healthful appearance; and strict and wholesome discipline is maintained within the prison enclosure.

I have brought the following objectionable points to the notice of the Commissioner of Police, with the view to have them rectified, and I have his assurance that he will endeavour to do so.

First.—The state of the privies, the roofs of which should be raised, the means of free ingress of air below, with egress for it above, the ignition of charcoal with black salt daily in each privy, and the introduction of improved urinals into the cells in lieu of the present chatties in use.

Second.—Tubular ventilators in the roof and walls where ventilation has not been already provided, weather-boards over the ventilators to prevent the admission of rain, and finally, the removal of the double wall, if this can be done with safety. There are now 266 prisoners in the Penitentiary, including Europeans and native; the percentage of sick from the date of the occupation of the institution is shown in the annexed table. The prisoners are classified, and the juvenile offenders have a range of buildings set apart for themselves. All are provided with excellent food, and have, in fact, every indulgence and comfort which parties in their position ought to possess.

I very strongly recommend that the prisoners in the Supreme Court Jail be transferred to this well regulated establishment, and that the former be henceforth disused as a jail. The hospital in the Penitentiary consists of upper and lower apartments, capable of containing forty patients. The upper rooms are particularly well ventilated. The jail and hospital are surrounded by a double wall, the outer eighteen, and the inner twelve feet high, the space between being eight feet. In January 1859, cholera in a very aggravated form attacked the inmates in the building. The Surgeon attributed the outbreak to the highly objectionable practice of keeping earthen vessels within the cells at night for the purposes of nature. So soon as this practice ceased the disease was arrested; "A simple and significant coincidence," the Surgeon remarks, "which confirms the

SERIES V. SECTION I.

" truth of that science and experience teach and encourage us to work on in " the face of all opposition in the struggling cause of sanitary reform." A range of twenty-four upper-storied cells are now in course of construction for European prisoners. This will in a great measure remedy the great original defect of the building, *viz.*, the deficient elevation of its basement. When these are completed, the sea-breeze will reach the cells in all its purity, for the height of the range exceeds that of the surrounding wall.

The medical duties of the Penitentiary are carried out by the Surgeon of the 1st District, because at the period when the duties of the District Medical Officers were apportioned, this Officer had the jails placed under his charge. Since that period, the Penitentiary has been erected and other duties not then in existence have also fallen to him, which render his labors very onerous. He ought to be relieved from the charge of the Penitentiary.

Male Civil Orphanage. Female do.

In the former of the Orphanages there are forty-eight and in the latter seventy-two children. The institutions are supported chiefly by private funds, Government giving a grant-in-aid. The dormitories of both schools are much crowded. Tubular roof ventilation should be introduced to remedy this. The girls have an anæmic appearance compared to the boys. I am informed that seventy-two girls receive only the same amount of butcher's meat that is allotted to the forty-eight boys. The elder females receive instruction in physiology and sanitation. Slight cases of sickness are treated in the Superintendent's house, and severe cases at the Infirmary ; both are objectionable. But the funds of the institutions will not admit of the erection of a separate hospital.

Colonial Emigration.

The duties appertaining to this office take up much of the District Surgeon's time. From 8000 to 10,000 emigrants are annually examined, prior to proceeding to the Mauritius and West Indies, and all this work he does without additional remuneration ; I beg to suggest that a medical fee be levied on each cooly examined, to reimburse the Medical Officer for his trouble.

Slaughter house and Market.

The slaughter house in Black Town is kept clean, and offal is removed before putrifaction can take place. Bullocks for the troops are slaughtered at Perambore. An Officer of the Commissariat Department should occasionally see that the cattle about to be killed are free from disease and in good condition. Those that I saw were lean, bony, and barely able to stand.

SECTION II.

Second District.

2nd District.
Female Asylum.

The Female Asylum is a model institution in every way. There are now 213 children accommodated there, of whom nine are sick. The building is not over-crowded; the ventilation is very tolerable; and the position it occupies is the best in Madras. The internal arrangements are faultless; the girls are clean and neatly attired; their food is good and wholesome; the ground is clear of surface filth; and every attention is bestowed to the preservation of health. To Mr. and Mrs. Wright, resident Superintendents, and the Surgeon of the District, this favorable state of things is due, and no other institution in this Presidency can produce a cleaner bill of health. Disease, in fact, is unknown, and the young and interesting inmates of the establishment are healthy and happy. The only disorders which ever afflict them are those incident to childhood, and these are usually of a very mild form. No case of cholera has occurred in the institution since 1849, and no death for three years, although many of the children when they enter the establishment have hereditary idiosyncracies, and their health requires watching. Twenty of the senior classes go through a system of training, to enable them to officiate as nurses, and every endeavour is made to train them to be useful soldiers' wives, to whom as they attain the proper age, they are usually married. I examined the class, and was much pleased with the knowledge they had acquired. Below is a syllabus of the theoretical branches taught, a practical knowledge being acquired in the hospital attached to the institution.

Bandaging.

Bandaging.—At which they are very expert.

Popular and regional anatomy and physiology; a general knowledge of the human body, its various organs and uses.

Sanitation.—To be made acquainted with every subject relating to health, *viz.*, food, exercise, clothing, cleanliness, ventilation, &c.

Sick room management.—Administration of medicines, application of leeches, lotions, fomentations, cleanliness, darkening of the apartment, quietness, cooking for the sick.

Household Medicine and Surgery.—How to act on emergencies as in fainting, hysterics, convulsions of children, burns, stings, wounds, and the simplest mode of treating the diseases commonly met with, as fever, cholera, dysentery, sore-eyes, cutaneous eruptions; how to prepare poultices, lotions, &c.; dress wounds and blisters, &c.

SERIES V. Section II. Vepery Dispensary.

The Vepery Dispensary was established in 1848. It is situated in a densely populated district, and receives the sick from Vepery, Choola, Pursewakum, and Perambore. Cholera is never absent from this locality; the disease has found a nidus here, and will not be displaced until judicious sanitary improvements are introduced. The drainage every where is abominable. The air is polluted with poison evolved from open sewers, stagnant pools, town refuse and huge heaps of human ordure, the accumulation of years. The above localities are always under the influence of the emanations from these foul regions, which during the prevalence of the north-east monsoon become wafted all over the district.

To bring about a beneficial influence on the public health in this quarter, new roads must be opened, old ones widened, drainage must be improved, and above all a stop must be immediately put to adding to the present heap of human ordure and the animal remains above referred to; what has accumulated must be removed, and the ground on which it stands placed under cultivation. I very earnestly entreat that immediate action be taken in this all-important matter. I am perfectly aware that I am not the first or perhaps the fiftieth Medical Officer who has urged the necessity of official interference here. The records of the Director General's Office contain the repeated representations of the late District Surgeon, Dr. Kellie, always foremost in urging the application of sanitary science to improve the health of his district; and Dr. Mudge, the present incumbent, has by urgent solicitations succeeded in correcting the evils emanating from the slaughter houses which, until lately, were another great nuisance in the same neighbourhood. Representation is all that the Medical Officer is able to do, in order to remove these loathsome sources of diseases. Dr. Mudge informs me that a low form of typhoid fever, a disease heretofore unknown in Madras, now prevails in this district; and that an entire family of five, the children of respectable Indo Britons, were recently swept away by cholera in Pursewakum. An analysis of the water in the wells in this neighbourhood show that the percolation through the soil from these surface deposits, has affected its purity. It is needless to multiply examples of the fatal effects of the present, almost total absence of conservancy regulations in these districts. I recommend that gangs of scavengers, before the setting in of the rains, remove all town filth and the heaps of night soil into boats on Cochrane's Canal, whence, or by the Rail, it be conveyed to a distance from human habitation; the erection of latrines and the introduction of such other

judicious sanitary arrangements under the Surgeon of the district as he may deem necessary. SERIES V. SECTION II.

The class of patients who usually come for aid to the Vepery Dispensary are such as might be expected from the localities I have described; anæmic, phthisical, scrofulous, dropsical and syphilitic adults of both sexes, and squalid half-starved children with abdomens swollen from mesenteric and other organic diseases. The average daily number of sick is, in-patients 33, out-patients 147. But syphilis is the great and prevailing disease. During the past ten years there have been a daily average of twenty-nine under treatment or about 3,556 in all, while fully double that number sought relief from rheumatic affections, &c., consequent on the disease. Few of these seek relief until they have failed in procuring it through their own huckeems, and they usually make their appearance at hospital in a deplorable state, as much from the effects of the remedies as from the disease. A large proportion of this class are females, who practice their trade and propagate their disease uncontrolled until forced by the gravity of it to seek European aid.

A large number of respectable people also resort to the Vepery Dispensary, but the accommodation, until recently, did not admit of any classification being made. A commodious up-stair house has been recently secured in a central and airy locality into which the sick are now received.

There is no separate Medical establishment here; the duties appertaining to it are provided for in the Vepery Dispensary. Gun Carriage Manufactory.

These mills are placed in Perambore; the strength of the establishment consists of Natives 180, East Indians 20, Europeans 4. There is a supply kept there of all medicines which are likely to be required on an emergency. An ample supply of cotton and bandage cloth is also at hand, so arranged, that it can be applied without delay in cases of burns from sudden explosion. I have witnessed two such explosions. Many lives were lost and permanent injuries inflicted from the falling of debris. In large powder works in England, contiguous to the apartments in which explosions usually occur, are strong curtains of masonry partly roofed, behind and under which the workmen rush for shelter. The apartments themselves are made of non-resisting materials which are not likely to cause damage by splintering. Powder Mills.

SECTION III.

Third District.

SERIES V. Section III. 3rd District.

This is undoubtedly the most extensive district in Madras, in length it extends six miles, and in breadth upwards of three. Within the area of the district the larger portion of the European community reside. The Surgeon in charge besides affording aid to residents, has to attend on the numerous Officers, their families, and others, to be found in seven large hotels, which are full nearly all the year round, all of which are within this district.

There is great want of drainage in Nungumbaukum and in part of Egmore. During the rains the water stagnates in places where a little surface drainage would carry it to the river. The District Surgeon reports to me that consequent on the evils resulting from this state of matters, fever visited almost every house last season, and he anticipates even worse results this season, unless measures are adopted to check the evil before the monsoon sets in.

The following are the worst spots in the district requiring the introduction of immediate sanitary conservancy measures.

First.—Village on the road leading to Mackie's Gardens in Nungumbaukum; the road leading to it and the hedges around are notoriously in a very foul state. Some of the worst cases of low fever occurred in this neighbourhood.

Second.—The Patcherry attached to Egmore contains much filth, and the drainage throughout this town requires to be improved. At present the main open sewer flows within a few feet of the Male Asylum, close by cultivated fields, which are placed between the Municipal Commissioner's Office and the Military Male Orphan Asylum, containing 255 children.

The Surgeon in charge of this institution and the Superintending Surgeon have represented the evil effects of this nuisance to the Municipal Commissioners as follows: "The whole drainage from the village of "Egmore stagnates in one or two fœtid pools under the windows of the "hospital, and the cultivators are constantly in the habit of placing a "dam in the course of the drain for the purpose of more easily using the "sewage for the fields;" and on another occasion he wrote: "The greater "part, if not the whole, of the sewage from the village of Egmore flows "along this drain; the cultivators are constantly in the habit of arresting

"it by means of a dam placed a little below the bridge leading to Colonel "Boulderson's house, and the result is that the hospital is filled with "foul air from this source. The Superintending Surgeon agrees with me "that immediate steps should be taken to abate this nuisance." The Municipal Commissioners after an inspection of the place by the President, reply to the above as follows: "The Board do not see the necessity "of altering the course of the drainage in this locality." This was in October 1858, and so matters continue to remain. I trust the Director General will go up to Government on this point. In the first place, because the evil might be remedied at a very small cost; in the second, because it will exemplify how the representations of responsible sanitary advisers are treated; and in the third, because the District Medical Officer reports that the nuisance is becoming intolerable; the windows of the hospital are obliged to be kept closed and the sick suffer.

Military Male Orphan Asylum.

This valuable school was established in 1784 for the support and education of European soldiers' children. From what has been already said it will be inferred that the position of the Asylum is not particularly favorable to health. Two distinct fatal cases of typhoid fever (using the term in the sense it is now accepted as a disease which has an animal poison for its cause), occurred during the past year, and there were ninety-two cases of fever treated. Ophthalmia, which at one time was the scourge of the school, has almost disappeared under the judicious prophylactic measures introduced by the Surgeon in charge.

SECTION IV.

Fourth District.

Section IV. 4th District.

Prior to 1847 the sanitary condition of Triplicane, which, next to the Black Town, is the most populous town within the Presidency division, was in a very unsatisfactory state. In that year, important sanitary reforms were instituted by the Marquis of Tweeddale. Large quantities of prickly pear, which had been allowed to over-run several waste places excluding air, and harboring dirt and vermin, were removed; hedge-rows were cut down, and orders were passed that these should not be permitted to exceed seven feet in height. Dense plantations were removed; planting of cocoanut trees was prevented, because of the brushwood which necessarily surrounds them when young; and new wide roads were opened from the beach, through crowded districts, which,

until then, were hot-beds of disease. All these measures have materially added to the salubrity of the place. Localities where fever and cholera were formerly epidemic, are now comparatively free from disease; and although the poverty of the population has very much increased since that date, in consequence of the death of the Nabob of the Carnatic, and the reductions of his establishments, I am assured that there do not exist here those frequent and fatal cases of fever of a typhoid type, which I have described as being present in other parts of Madras.

Much, however, as has been accomplished, there still remains much to be done. In company with the District Surgeon and the Native Surgeon under his orders, I personally inspected every part of the town, and only those who do so can form an idea of the amount of filth that is accumulated in out-of-the-way places. There are several goontas or tanks of an offensive character, to which I would direct the attention of the Municipal Commissioners. When I visited the Darec-wara-goonta, two scavengers' carts were unloading the sweepings from the streets and sewers on its bank, in the very centre of the town, and in the midst of a crowded locality. The inhabitants in the neighbourhood tell me that the stench from this spot is dreadful, and produces sickness and vomiting.

Intramural burials.

An other locality which requires the interference of the authorities is the large Mahomedan burial ground around the attee goonta, or the Elephant tank. This is a most unhealthy position, and is filthy to an extreme degree, from the mass of corpses now interred there. The practice of placing a mat over the face of the corpse, one end being above the ground is universal; this is removed on the fourth or fifth day, meanwhile the gases from the body rapidly decomposing, escape by the aperture and pollute the air. Burials, I learn, are quite superficial, a sprinkling of earth being merely placed over them. The natives around are obliged to make use of the water in a tank in the centre of this sepulchre for drinking as well as for ablution. The Native Surgeon who has extensive knowledge of the district, assures me that he has known very many cases in which parties are affected by its impurities, and that, if a jar of this water be put aside for twenty-four hours, it soon begins to smell, and a greasy-looking substance floats on the surface. There are other burial grounds as well as burning grounds in the heart of this city, and which are a nuisance to the community, and also destructive to health.

Scavengings.

The refuse matter of Triplicane, the street sweepings and the night soil from houses, &c., are deposited by the scavengers on the edge of a

backwater between St. Thomé and the Masonic Lodge close to the highway on the beach, where the community of Madras resort for fresh air every evening. This is a source of much annoyance to every one, especially to those who are compelled to reside in the neighbourhood; during high tides the water covers all this filth, and when it again returns, the sun's rays disengage offensive vapours, which are destructive to health and a great nuisance to residents and to passengers on the highway.

The sanitary condition of this locality requires,

First.—That all intramural burial grounds and Hindoo burning grounds should be closed up, and scavengings ought to be taken away out of the town by cart or rail, instead of remaining amongst living men, polluting the air they breathe, and the water they drink. A convenient locality should be selected for the collection of filth, it should be surrounded by a wall, and in course of time it can be applied to enrich and improve the soil.

Second.—That the main drainage, as well as those throughout the town, requires to be improved.

Third.—That another public privy is required in the centre of the town, and finally much good would be accomplished by securing still further free admission of fresh air from the sea in the direction of St. Thomé, to the upper and western wall of Government House.

Triplicane Dispensary.

This Dispensary is situated in a healthy site in Royapett. The beneficial influence of the institution in affording relief to the poor and diseased amongst the inhabitants of this densely populated district is best exemplified, by showing the increasing confidence it has steadily maintained since it was removed to the present locality in 1853. In that year there were 526 patients treated in hospital, and 9,027 applied for relief at the Dispensary. There were treated last year in hospital 603 males and 307 females, being 910 in all, and no less than 13,386 sought relief at the Dispensary; amongst the in-patients last year there occurred 105 deaths, a very large average for natives, but this is accounted for by the circumstance that numbers only seek relief when disease has advanced too far to be benefited by medical aid. On the morning of my inspection, 440 sick were on the list; syphilis and its combinations, as usual, form the large majority of the admissions, bowel disorders are next in frequency, and sporadic cases of cholera occur throughout the year.

I have seen no institution in Madras equal to this in the excellence of its arrangements. As sick are admitted in hospital, they are washed,

SERIES V. SECTION IV.

their own dirty clothing is removed, washed, numbered, and put aside, and they receive a hospital dress; on their discharge, their own clothing is returned to them *clean*. This is not usually done. I recommend that this system be enforced throughout the Presidency in all Civil Hospitals. The privies are kept clean; they require, however, roof ventilation and some little repair; the grounds around are clean, and the Wards, Dispensary, &c., are admirably arranged. Surgeon Porteous (who is now on other employment) established the present system, and it is highly creditable to him. I learn that some very important and common medicines, as bi-carbonate of potash, sulphuric æther and others, were not supplied on the last annual indent, there being none in store. Of instruments there is an excellent and a large supply. Surgical cases are of frequent occurrence in this district, and several serious operations are annually performed. The Surgeon in charge informs me that he is put to great difficulties by the frequent withdrawal of his Medical Subordinates; the number of his sick and the voluminous nature of his reports render it necessary that his establishment should not be reduced.

Cooking apparatus.

Dr. Duff has introduced a very superior style of cooking apparatus, which is admirably adapted for hospitals and barracks. It has only one fire place, the flame and the heat being confined, are made to pass by means of a tube under plates perforated for the introduction of cooking vessels, then to traverse an oven, and finally to escape by a narrow flue without smoke. This is not only a great economy in fuel, but cleanliness and convenience are also secured. By Minutes of Consultation, dated 9th November last, the Government directed that a complete set of these cooking apparatuses should be introduced into the General Hospital kitchen. Dr. Duff is anxious to obtain permission to introduce one into the kitchen in the establishment under his charge. I beg to recommend this to the favorable consideration of the Director General.

Coroner's Inquests.

These are of almost daily occurrence at the Presidency; a Medical Officer attends, and he is obliged to make his examination of the body, sometimes in the open air with or without an umbrella over his head, or in a low verandah, or under the kannat of a tent, or in whatever other place the Coroner may direct. The Director General will allow that at any time, even when the cause of death is evident, this is a most improper mode for the Medical Officer to conduct his examination, and that it is derogatory to his position and profession to be subject to the gaze of a crowd in the open streets, while employed on duties of so serious and delicate a nature. The ends of justice are apt to be defeated, for it is

quite impossible for him, under such adverse circumstances, to trace the cause of death, when this is obscure, or when a minute examination has to be made; and on his evidence, thus procured, may depend the life of a fellow-being. He is at times summoned to the Coroner in the evening, when the examination has to be made with candle light, or if it be postponed until the following morning, putrefaction has set in, and he is thus placed in a position which is positively injurious to his own health.

I beg very strongly to urge that the Director General will use his best endeavors to correct this improper state of matters. A tent has been placed at the disposal of the Coroner for the use of the Medical Officer, but these inquests constantly occur in streets so narrow that the tent cannot be used; at other times the Coroner and his Jury establish themselves in the tent, leaving the Medical Officer to shift for himself. Strong representations have been made to me by all the District Medical Officers on this subject, who complain of the unpleasant position in which they are thus often placed. An inquest room, properly furnished, should be attached to Police tannahs in central positions.

Lying-in-Hospital.

This eminently useful institution was founded in 1844. It had its origin in private subscription, Government contributing the medicines only. Its usefulness becoming speedily developed, commodious premises were erected by Government, and they took on themselves the entire maintenance of the establishment. The hospital is situated on the west of Chintadrepett, with the Cooum river in front and the village of Egmore in the rear. There is a free space around the building, but a broad ditch intersects the ground on the east, which conveys to the river the surface water and drainage from the higher grounds around Egmore: this is objectionable, as when the stream dries the exposed bed becomes very offensive. I think this might be remedied by deepening the channel, and thus permitting the water to flow back from the river, and at all times to cover the bed of the stream.

The building forms three sides of a square; the wards are spacious, and it is capable of accommodating seventy beds. The left wing has two apartments, the front is occupied by the matron, the other is set apart for European patients. The right has also two apartments, one is used for natives expecting confinement, and the other as a Dispensary. The centre building is divided into four wards, one being an examination room, and the others for lying-in natives. The great fault of the building is its low basement. In 1857 it was submerged to the depth of eighteen inches, and the grounds around to the depth of three feet. Quarters for the Apothecary

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are placed contiguous to the institution. Water has been brought by means of pipes into the hospital, and this is found a very great convenience.

In addition to the original purposes for whieh this hospital was founded, Government in 1851 sanetioned the addition of a Dispensary for the treatment of diseases peeuliar to women and ehildren. The operations of the Dispensary have been progressive sinee its establishment. The prevailing diseases treated have been leueorrhœa, uleeration of the osuteri, disordered funetion and displaeement of the uterus. Dr. Paul informs me that the foundations of these diseases are, frequent ehild-bearing, or protraeted nursing, aggravated by unwholesome and insuffieient food, seanty clothing, and uneleanly habits. No syphilitie eases are admitted for treatment; and the eharacter that the institution has maintained in the estimation of the eommunity is proved by the number of Europeans, Indo-Britons and high easte natives, who resort to it for aid.

Patients are eneouraged to eome to the institution some days prior to the period when they expeet their eonfinement, and they receive the sum of one Anna per diem to provide themselves with food during the period the Surgeon thinks neeessary to keep them in hospital. The eonfinements are elassed into ordinary, tedious, and laborious; deaths are usually the result of mal-treatment prior to admission.

In 1854, with the sanetion of Government, a elass of females to be educated as nurses and midwives was instituted. They are made to pass through a severe examination, and receive Certifieates of qualification to praetice midwifery, after eompleting a period of not less than nine months' attendanee in hospital. Fourteen of these females, who reeeived Certificates, have entered on their duties in different parts of the Presideney, where they do much good.

That the eharitable objeets Government had in view in establishing these institutions have been fully realized, may be eoneluded from the annexed table showing the progressive rate of admissions from their foundation till the end of the past year.

Table of the annual number of confinements and admissions into the Dispensary at the Lying-in-Hospital, from the foundation of these establishments to the 31*st December* 1858.

	1844	1845.	1846.	1847.	1848.	1849	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.
* Actual confinement in Lying-in-Hospital.	15	62	122	105	139	192	313	407	504	517	714	739	857	789	957
Dispensary for diseases peculiar to women and children.	...	...	...	...	...	...	...	...	1,223	2,864	3,598	4,050	5,501	5,656	6,222

Natives of caste and respectable classes now apply for relief from distant parts of the country, showing that the old prejudices of the people are being gradually overcome. The Director General is well aware, that to Mr. Shaw is mainly due the credit of this great service to the cause of humanity. The system introduced by him is well carried out by his successor Dr. Paul.

Lunatic Asylum.

In the course of my inspection, I have represented to the Director General the wretched position of those unfortunate persons who are bereft of their reason. If considered harmless, they are permitted to mix promiscuously with the other sick in hospital, much to their discomfort and serious inconvenience. If unruly, they are confined to a miserable den, or chained by the leg to the floor, possessing as much liberty only as the length of their shackles will admit, and living in an impure fœcal atmosphere. At some of the larger stations on the Bombay side, I observed that padded rooms were allotted for the reception of violent insane patients, and the windows well elevated above the basement so as to prevent parties injuring themselves; and in Calcutta the Lunatic Asylum there far surpasses anything of the sort in this Presidency.

The rule of the service, which renders necessary the detention and treatment of maniacs for three months in hospitals destitute of every appliance for such a purpose, before sending them to the Lunatic Asylum at Madras, is, I consider, highly objectionable. It is a fact, now universally acknowledged, that if anything is to be done in the treatment of insanity it is within the first three months. The experience of every man intimate with the treatment of the insane, is, as I have stated it. The moral treatment adapted to each varying case with such signal success, during the first months of a diseased mind, in our well managed institutions in Europe, is under our present system lost to the patient.

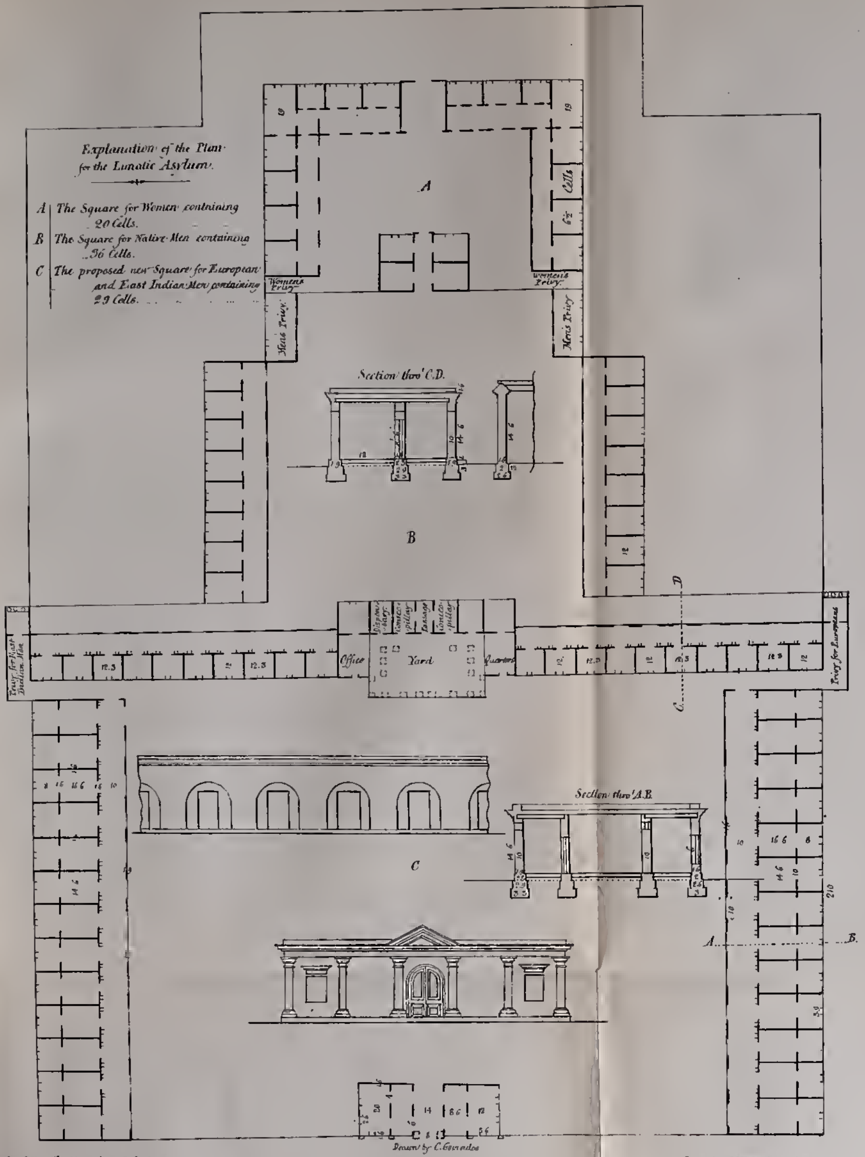
In the provinces maniacs are usually confined in Jails. At the Presidency a Lunatic Asylum is available for European, East Indian, and Native insane of both sexes. It contains fifty-six badly ventilated contracted cells, a number far too few for the wants of the Presidency; moreover the accommodation and conveniences within the building are so wretched, that it is quite impossible to enforce an improved system of treatment or ensure cleanliness and security, without resorting to restraint. The Surgeon in charge informs me that there are constant requisitions on his part to transfer patients to the Monegar Choultry, or to their friends, in order to make room for maniacs expected from up-country, and it is absolutely

SERIES V. SECTION IV. necessary to have spare cells which can be left vacant for some days on account of the shockingly filthy state of some of the inmates.

But apart from the want of conveniences and space, I would especially draw the attention of the Director General to the impossibility of applying to the inmates of the establishment that humane system of management which has been found so beneficial in Lunatic Asylums in Europe. Here, when one patient becomes violent and mischievous, the others are apt to become excited, and the attendants are not unfrequently injured. Dr. O'Neill was confined to the house for two days from the effects of a blow received. Mr. Mason, the resident Honorary Assistant Surgeon, and Assistant Apothecary Dalrymple, have received severe injuries, and it is difficult to retain the services of the keepers and others from this cause. One man in taking his discharge recently said to the Surgeon that he desired to leave, because, "I may be bitten "or lose my life, or get my clothes torn; I have no hope of reward or pen-"sion, and can do better as a cooly outside." An important part of the treatment is, to secure the services of good men, who know their duty, gain courage, and are able to coerce. In an Asylum at Home instant means of applying coercion, and of removing unruly patients, are always at hand.

The mechanical restraint to which the lunatics are subjected, excites irritable patients to violent muscular exertions, or the melancholy to deeper woe. In our best institutions in Europe, the unfortunate inmates are never degraded by hand cuffs or chained to a pillar or to the floor, and transformations follow whenever such modifications of the treatment are introduced. It is undeniable that the interest lately evinced by the Legislature at Home in the treatment of lunatics, has materially improved our asylums there, and has tended to bring about a more humane system of managing the inmates. I trust the influence of the Director General will be exercised to rectify the state of matters at this place, and to have a building constructed sufficient for the wants of this vast Presidency in which the patients can be properly classified and treated.

An examination into the records of this establishment satisfies me that Surgeon Mayer has been unceasing in his exertions to bring about a better order of things. The building which serves the purposo of Lunatic Asylum is favorably situated. I learn that it has been rented for sixty-five years at Rupees 250 per mensem, so that upwards of Rupees 16,000 have been sunk on these wretched premises.



Supg. Engrs. Office, Central Circle, D.P.W.
Fort Saint George, Mar 1859

Signed / W. H. Horsley, Major.
Acting Supg. Engr. Central Circle D.P.W.

Govt. Lithc. Press, Central Office of P.W. Chepauk 1862.

J. Murphy, Supt. & Manager,
Govt. Lithc. Press, D.P.W.

W. H. Horsley, Lieut. Colonel,
Chief Engineer D.P.W.

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A sufficient amount of care has not always been exercised in the selection of cases transferred to this institution. On the 13th July 1858, a European was sent there from the General Hospital laboring under delerium tremens. This man on the representation of the Superintendent, supported by Superintending Surgeon Kellie, was on the 19th idem re-transferred from the Lunatic Asylum to the General Hospital. On the occasion of my inspection there was a soldier of the Fusiliers in the asylum, who had passed through much suffering from a severe wound of the leg with comminuted fracture of the tibia. It appears that while in the General Hospital he exhibited some mental hallucinations, on which he was sent to the asylum. So far as I could observe, he was sane and rational in all his ways, and he expressed himself to me as being much injured in being associated with lunatics. He remained in the asylum from the 9th April to the 7th of May, on which date the Superintendent reported to me that he was again re-transferred to the General Hospital.

Eye Infirmary.

In this establishment, European and East Indian soldiers, Native sepoys, and a large number of civil patients receive professional aid. It is the only institution of the sort in this Presidency, and public servants of Government are sent thither from all out-stations. For the accommodation of Europeans, a separate room to contain eight patients is specially allotted ; a very small space, it will be admitted, for the wants of the country. That for the natives is ample ; but both their apartments, and that for the Europeans have not sufficient ventilation and are not well adapted for an hospital.

On the morning of my inspection, there were eight Europeans and thirty-eight natives under treatment. Ophthalmic attacks and cataracts are the prevailing affections.

The Honorable the Governor's Body Guard.

The only malady which appears to afflict the Body Guard is dracunculus. The men chiefly reside in Triplicane, where the water is impregantcd from many causes, and although the origin of dracunculus is not yet accurately ascertained, the inquiries of Dr. Carter of Bombay, and others, tend to establish that it is imbibed into the system solely from this source. The following statistics of the Corps, gleaned from the records, from January 1848 to December 1858, are interesting, as showing the extent to which the men were affected by guineaworm.

Per centage of cases of dracunculus to strength of force...	33·0
Per centage of cases of do. to all diseases.........	30·41
Average number of days each man was in hospital for guineaworm..	28

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Forty-three men at present in the Corps have had guineaworm, and these have been 298 times in hospital; making a total of 5,505 days lost to the service in the above period.

The following table exhibits the actual number in hospital each year for guineaworm for a period of eighteen years.

Years.	1841.	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.
No. of Cases.	21	14	28	18	27	7	15	72	71	52	52	53	41	34	18	29	22	19

Civil Dispensary, General Hospl.

This Dispensary was only established last year. In January of this year, 102 sick applied for relief, in February 97, in March 117, in April 102, in May 93, in June and in July 108; the prevailing disease being syphilis. The accommodation provided for the sick is very poor, a low roofed, ill-ventilated tiled building; and I do not think that there is sufficient encouragement, judging from the number of applicants for relief and their slight ailments, to continue this institution. On one side, a short distance removed, is the Chintadrepett Dispensary, which is more central, and may be made fully capable of meeting all the wants of the locality; on the other is the Salay street Dispensary under Native Surgeon Jesudasen, and contiguous to that is the Monegar Choultry, the Vepery Dispensary and Hospital being also in the neighbourhood. The sick of the neighbourhood are able to receive relief at any of the above places, and the contiguity of the buildings of the present Dispensary to the General Hospital is most objectionable, interfering with ventilation, and in consequence of the bad accommodation, the want of conveniences, and imperfect drainage, surface filth accumulates and prejudicially affects the atmosphere around. I consider that the State may be saved the expense of this recently formed establishment.

General Hospl.

The building used as a General Hospital was, I am informed, erected 135 years since as a godown for goods. I have gone most carefully into everything connected with this establishment, and have no hesitation in affirming that in its present state, I have not seen in any part of Her Majesty's dominions a worse Military hospital. The position it occupies, is, I believe, a salubrious one. Medical Officers who have been attached to it for upwards of twenty years affirm that it is so, but

it is wanting in conveniences, altitude, in both basement and ceiling ventilation, drainage, &c. It is cramped on all sides by poorly constructed buildings, with low tiled roofs, occupied also as apartments for the sick, privies erected without regard to sanitary considerations; high prison-like walls nearly surround it, it is in close contiguity to a range of low brothels and grog shops, and to the Cooum, which at times is very offensive.

A small range of Officers' quarters is attached to the General Hospital, where unfortunate Officers who may be devoid of reason, or otherwise afflicted, or friendless and disabled from disease, are received and attended by the Medical Officers of the institution. These quarters are contiguous to, and rendered offensive by their proximity to the Dissecting room of the Medical College, and they are open to the many other objections attached to the General Hospital itself.

There are many objectionable points in this institution, which I would comment on were it not that an opportunity will ere long be afforded to remedy these. A building, suited to the wants of the head-quarters of this large Presidency, and more in accordance with the recognized necessities of a hospital for sick European soldiers, is now being constructed. No improvements, however, will be complete that fail to comprise the removal of all objectionable houses around the original building, including the grog shops, &c., on the other side of the road, the erection of a second story on the present building, free ventilation of all the wards, and the extension of the area around the building by means of a dwarf wall and railing to enclose the entire space from the General Hospital bridge, and road running parallel with the hospital to the Cooum river.

The sick admitted into hospital are divided into two classes, Medical and Surgical; each Medical Officer has thus his distinct and separate charge. On the morning of my inspection, 146 sick were under treatment, *viz.*, 94 Europeans and Indo Britons, and 52 Natives; of these 72 were in the medical wards, and 73 in the surgical. In the former it is difficult to say what the prevailing diseases are; for the class who form the admissions are very indiscriminate—sailors, soldiers on leave, and residents in Madras, &c. But the returns in the records indicate a slight preponderance of admissions from affections of the lungs. In the surgical, venereal diseases, in their primary and secondary stages, form the large majority of the admissions.

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The following table exhibits the several departments at the Presidency, who receive medical aid at the General Hospital, and the average strength of each.

	Europeans.	Natives.
Gunpowder Manufactory........	5	115
Artillery Veteran Company and discharged men... ...	72	15
Camp Equipage Department...... ....,...............	4	157
Ordnance Department..	34	526
Commissariat Department...............	9	190
Gun Carriage Manufactory.................	104	337
Pension Establishment...........	68	570
Quarter Master General's Department..................	0	36
Engineer's Department...............	27	134
Department Public Works............	2	0
Total average...	325	2,080

Not including seamen and sick of Detachments, European and Native, on leave or on duty at the Presidency.

H.M.'s 44th Regt.

The sick of this Regiment are accommodated in the General Hospital. There are usually, with convalescents, above 10 per cent. on the sick list, the prevailing diseases being ophthalmia, fever, bowel disorders, cardiac affections, and syphilis. People are so accustomed to see so large a per centage of sick from the Regiment quartered in Fort Saint George, that it has ceased to excite inquiry why the men should thus suffer from diseases which do not afflict the Officers of the Garrison, and in a ratio so much in excess of what attains amongst the Civil European community at the Presidency. That the crowded state of the barracks, and impure air, generated by so many men consuming, day and night, an atmosphere already rendered impure, by bad drainage, proximity to privies, confined space, &c., are the cause of this large amount of sickness, has been, I believe, admitted by every Medical Officer who has inquired into this subject.

Barracks.

Improvements on a large scale are, however, in progress, which will give free admission to the pure sea-breeze into every part of them, more perfect ventilation, more space for the soldiers, and more protection from the direct rays of the sun, which heretofore beat with

violence on the walls. The importance of these improvements, now rapidly progressing towards completion, will warrant the following detail.

The addition of a verandah to the upper and lower stories on the east, south, and part of the west sides, so as to complete the verandahs all round the block of building; opening out the south and north ends so as to let a free current of air into and through the quadrangle of the building; cutting away of partition walls, and cutting down windows on the basement-range, in order to secure ventilation. In the upper-story there has been a very great improvement. The former quarters for twenty Officers have been converted into barracks, securing additional accommodation for about 250 men; there also all partition and cross walls have been removed, ensuring a free current of air throughout the building.

The cook-rooms, solitary cells and latrines, which are close on the west end of the building, a most objectionable position, are about to be removed; the solitary cells to the top of the rampart, the latrines to outside on the Saint George's berm, access to which will be through a sally-port. For night accommodation, water closets will be provided. close to the barracks, and the whole will be flushed by high service with soil pipes running out to the sea. The cook-rooms are to be in the casemates of the curtain at a more suitable distance than at present, so that the smoke will not reach the barracks as formerly. Communication to these and also to the privies will be protected by a covered verandah.

In connection with the above improvements, Rupees 50,000 have been sanctioned by the Supreme Government for a complete system of drainage from the Fort, a great portion of which will affect the barracks also. Considerable difficulties will have to be overcome in effecting this, in consequence of the low level of the ground and the little rise and fall of tide, *viz.*, ten feet. On the recommendation of Colonel Arthur Cotton, Commandant of Engineers, a large reservoir is being prepared on the top of the grand magazine which will be fifty-three feet above mean tide, and the top six feet above the roof of the barracks. The cistern will contain 19,000 cubic feet of water, and it will be kept constantly filled by two six-horse power engines, the water being drawn from the Fort ditch, which percolates through the soil from the sea and from the Cooum river. It is intended that the water in the first instance should turn a wheel to propel the shafting of the presses in the Government Printing Office, and from thence be applied for scouring

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and flushing the several drains in the Fort. By this arrangement it is calculated that fifty cubic feet of water additional to what is now expended will flow off into the main drain daily. Urinals will be placed in different parts of the building upon the Railway principle at home, the head of water for feeding these being drawn by syphon pipes from the main reservoir.

In the construction of the solitary cells, a double roof will be formed on the principle of that adapted to palanquin carriages; the inside roof is to be of wood with a three feet square aperture in the centre through which the impure air will ascend, and ventilation is otherwise provided for by ingress from grated openings below; each cell will contain 2,300 cubic feet of air. When the improvements in the barracks are completed, it is calculated that the upper story will accommodate 800 men, affording about 1,300 cubic feet of air per man, exclusive of the verandahs. There will also be the same space below, where, on account of the objections to men living on the lower basement of a building surrounded as this one is by high ramparts, the lesser number of men will find accommodation. It would have further materially improved the sanitary condition of the barracks if the lower ranges could have been set apart altogether for Non-Commissioned Officers' quarters, Orderly rooms, Workshops, Lavatories, Refectories, &c.

Formerly there were great objections, besides being a matter of much discomfort, to all Officers, married and single, living under the same roof with the men; this is now being remedied, and the Officers will, in future, have other quarters provided for them in the Fort, by the removal therefrom of some of the public Offices to Chepauk.

In connection also with the above improvements, additional free ventilation will be secured by lowering the sea ramparts, from their present elevation nineteen feet to an average of eight feet. Thus free ingress for the sea-breeze will be afforded, and will do much to secure the sanitary condition of the Fort generally, particularly when it is remembered that for three-quarters of the year the wind blows from the sea. Gas works are also sanctioned experimentally for lighting up the barracks with oil gas; the buildings are nearly completed. Operatives have arrived from England, and in a few weeks the project will be carried out. Should it succeed, the project will be more generally adopted.

Coupled with these extensive changes, which are calculated, it is to be hoped, to effect a vast sanitary improvement in the health of the men quartered in Fort Saint George, minor points have not been lost

sight of. In the north-east barracks, washing places are to be erected separate from the bathing-rooms, where a range of basins will be provided, water being conveyed by pipes to each. The Garrison and Regimental Libraries are to be enlarged, and Workshops will be prepared for the different trades. The Garrison Engineer now employs daily a party of the men on works connected with the barracks, at a rate of pay varying from 8 to 12 Annas daily. They are delighted to get employment, and they do the work cheaper and better than natives. It would be attended with much advantage to Government and to the men, if this system were extended throughout the Army. To be removed from their employment under the Garrison Engineer, is the greatest punishment which can be inflicted on the men. A new Skittle Alley has been built ; the Theatre has been improved ; and in addition to all these, His Excellency the Governor, to whom the soldier is indebted for the comforts above enumerated, which will tend to keep him healthful and efficient, has proposed to have a large Railway shed constructed, which will cover two Racket courts, near the house known as the Cadet's quarters (which will be pulled down), where they can amuse themselves during the day.

Viewing as I do these well devised changes as a vast measure of sanitary reform, I take the liberty to urge for the consideration of the Director General a few other points, which, I trust, he will submit to his Excellency with his support.

1st.—There are large berms and extensive glacis all round the fort, which might be given up to the men as gardens. They are now in many parts covered with rank vegetation.

2nd.—The walls around the grand Magazine and the Garrison School, which now obstruct the sea-breeze to the lower story of the barracks, might be advantageously pulled down, and railings substituted.

3rd.—The enormous piles of shot, which also obstruct the sea breeze, and retain the heat of the sun during the day to be evolved at night, might be removed with advantage.

4th.—The Regimental Guard rooms have been opened out and ventilated, but the Garrison Main Guard room is susceptible of much improvement. At present it is shut out from the sea-breeze, and it has no verandah in front to protect the inmates from the sun ; an important point, considering that twenty to thirty men live there throughout the year.

5th.—The Patcherry is very bad, and not at all suitable for Europeans in a tropical climate ; there can neither be privacy nor decency within its walls. On an average five souls occupy a room, which was formerly a stall

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SECTION IV.

for one horse. Privies, cook-rooms, and walls around shut out the sea-breeze; the rooms are so close and low as to be hardly fit for stabling, and the floors of many of them are lower than the surrounding surface.

6th.—I beg to urge the introduction, on a large scale, of Duff's cooking apparatus into the barrack range of kitchens. Apart from its other advantages, the consumption of its own smoke is a great recommendation where buildings are so close.

7th.—The purity of the supply of water in the Fort is an all-important consideration. The under ground galleries, fed from the Seven Wells, contain sufficient for 10,000 men for three months. It is contemplated to locate the Madras Sapper Militia Regiment contiguous to these wells. I trust this measure may receive re-consideration; for notwithstanding every precaution, I believe, it is a very questionable proceeding to congregate 5,000 or 6,000 souls so close to the streams on which so many of the community, as well as the shipping rely. It must have a prejudicial effect on the springs which, as already remarked in a former report, are not so pure now as they were some years ago. Finally, I would have the iron bars removed from every window. I would replace shutters everywhere by venetians. I would open out the windows at the north end, as has been done in the south, with the means introduced to keep out the force of the north-east monsoon when necessary. I would floor the solitary cells with boards instead of tiles, and I would introduce into all the privies not only the roof ventilation, but also the air vents constructed in the walls, as repeatedly urged by me in other reports. These air vents open into the sink below (where the gas is generated) by a funnel-shaped mouth, and are carried up through the wall, a system which I observed to be universally adopted in all privies both at Sebastapol and at Kertch.

Artillery Barracks.

The European Artillery barracks are situated in Saint George's empty bastion. They are double casemates with a small verandah in front; a portion only faces the sea-breeze. The cook-rooms and latrines are very bad, but new ones are sanctioned. These barracks are supposed to be cool, and it is said that the men like them; but on what principle it is difficult to find out. They are very low and badly ventilated. When I visited them with the Garrison Engineer about 8 A. M., we found many of the men off-duty, almost in a state of nudity, bare to the waist, seated at breakfast with their wives and children, a fact which does not tend to substantiate the general opinion. I think they should not be used as permanent quarters, although very good in case of a siege.

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Detachment Sappers and Miners.

Two Companies of Sappers and Miners are quartered at the Palace stables, Chepauk; 186 men and families occupy 100 stables; the sick are sent to the General Hospital; but a Native Dresser should, I think, be attached to the Detachment. There are thirteen on the sick list now.

Chintadrepett Dispensary.

The position of this Dispensary is very good, and the institution is the oldest in Madras. At present it receives Out-patients only, of whom 8,700 were prescribed for since the beginning of the year; the annual daily average sick treated is thirty-four. It is to this spot I would remove the General Hospital Civil Dispensary, and prepare Wards for the reception of In, as well as Out-patients, which might be done by raising the present building and putting another story on it.

Garrison Surgeon.

The Garrison Surgeon is also Superintendent of Vaccination at the Presidency. Eight Vaccinators itinerate under him throughout the Presidency. The Superintendent, with the aid of the Commissioner of Police, occasionally checks their returns. Success has not attended the Superintendent's endeavours to procure lymph from England; but he supplies all parts of the Presidency with what is kept up by himself, and states that he seldom has any complaints. During the quarter ending 30th June last, 1,159 European, East Indian, and Native children were vaccinated successfully. and during the same period there were 264 unsuccessful cases.

Under instructions from His Excellency the Governor, the Garrison Surgeon has within the past two months in addition to his other duties entered on a course of operative Dental Surgery, with clinical teaching to to all who desire instruction in the art. He devotes three hours of two days in the week to this duty, and already there is abundant evidence of the necessity for the introduction of this class; for about seventy men, chiefly out of Her Majesty's 44th Regiment, have received relief. Statistical records show that the average of decayed permanent teeth ranges as high as 25 per cent. up to the age of fifteen, that amongst adults it is very much greater, and that in the majority of instances, teeth are lost to the poor after much suffering from want of medical treatment. It is also well known that dyspeptic and visceral derangement result from this state of matters. In a return before me exhibiting the results of Mr. Porteous' labors since the 3rd June, the date on which he entered on them, I perceive that sixty-two individuals have had ninety-five teeth saved by timely stuffing, and the same individuals have had 196 fangs extracted or teeth removed.

Garrison Assistant Surgeon, Fort and Marine Department.

The duties of the Garrison Assistant Surgeon are to attend to all sick within the Fort, with the exception of those of the European Regiment quartered there. The average monthly applicants for relief is 200; but

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amongst these, there are the families of several Non-Commissioned Officers who reside outside the Fort. The Dispensary in the Fort is open at all hours. As Port and Marine Surgeon he has to attend to all accidents which may happen to crews of the shipping, to inspect all transports taken up for the conveyance of troops, to afford medical aid to all parties attached to Government ships unprovided with a Surgeon, and all retainers at the Custom House. A small stock of medicines is kept at the Dispensary on the beach, which is open from 9 A.M. to 5 P.M. By an order of 1826, on all occasions of landing of sick Details from beyond sea, the Assistant Garrison Surgeon has to detach his Apothecary from the Fort for this duty ; since that period the two appointments were united, and the duties appertaining to each are changed. A more convenient arrangement would be to detail the Apothecary on duty at the Port and Marine Department for this purpose, as he is always on the spot, and as having very much less to do than the other man in the Fort.

1st Native Veteran Battalion and Sapper Militia.

The Assistant Garrison Surgeon has also to afford medical aid to the 1st Native Veteran Battalion and to the Madras Sapper Militia, the former being about 900 strong, and the latter above 1,000. In the Veteran Battalion there are necessarily a large number of Invalids, and the mortality averages about one in eleven. Many old worn-out men with organic disease join the Battalion, apparently with the view of completing a period of service to entitle them to a pension, and never do any duty, or die off rapidly. The Sapper Militia are a newly embodied Corps ; they are low-caste, able-bodied men, their chief ailments being injuries from accidents and venereal disease. While employed at ordinary drill only, there was considerably more sickness amongst them than now, when they are kept well occupied on Sapper duties. The sick of these two Corps are accommodated in a sufficiently spacious hospital on the out-skirts of Black Town. On the morning of my inspection nineteen were in hospital.

2nd Regt. N. I. Vepery.

There are twenty-eight sick out of a strength of about 1,100 men ; the prevailing diseases being slight fevers and syphilis. The hospital is a rented building. It is badly arranged for a hospital, too narrow, too low in the roof, and wanting in ventilation. Nothing can be worse than the line accommodation for the Regiment at this place. It is low, and so confined in area, that upwards of 300 men are obliged to live outside the lines. The water supply is very scanty, so much so indeed that the men complain that they are unable to secure personal cleanliness, without which all sanitary measures must prove abortive.

SERIES V. Section IV. 25th Regt. N. I. Perambore.

The lines occupied by the Regiment stationed at Perambore were erected by Government some years ago. They consist of a substantially built single apartment raised some feet for each sepoy, having a front court attached, and although deficient in ventilation, the men are very partial to them. The strength of the Regiment is 1,021; and there are now forty-one on the sick list; the prevailing diseases being fever of an ephemeral nature and syphilitic affections. The hospital is a narrow ill-ventilated apartment, not capable of containing with any comfort above twenty-four sick; the verandahs are, therefore, also occupied, as are also the spaces between the beds when the sick list increases. The Surgery is detached from the main building, and the whole is surrounded by a dwarf wall surmounted by a railing. As at Vepery, the great drawback to Perambore is the want of water; there is no good drinking water within easy reach. Should Captain O'Connell's scheme of bringing water from the Red Hills to Madras be carried out, there is no part of Madras which will reap a larger amount of benefit from it than the two places I have named. Already in the Vehar water works at Bombay, the principle of conveying water a distance of ten miles from a large artificial reservoir has been fully carried out, the expense attendant on which was defrayed by Government as a loan, recovered from the community by annual instalments.

Chemical Examiner to Govt.

The Chemical Examiner to Government is not under the control of the Director General, but that gentleman politely invited me to examine his establishment and the appliances provided to carry out his duties. Dr. Scott has erected an apartment within his own compound, where his duties are chiefly carried on; and such tests and instruments, as he is unable to procure on the spot, he has authority to get from England. In all cases of suspected poisoning within the area of the Madras Presidency, whether human, or animal, the stomach or other portions are forwarded to him for examination. He has also to report on the specimens of soils, the chemical constituents of water, &c.

In the early part of this report, I stated that I considered the duties of the Medical Officers unequally divided, and that I thought a re-adjustment of them might be made with benefit to the public service and with impartial justice to individuals. I mentioned my views on this subject to the late Director General, who was pleased to concur with me in the advisability of re-considering the subject. He was of opinion that the matter was purely a departmental one, capable of being arranged by himself. I beg now to submit my views on this head.

1st.—The General Hospital Medical Staff to consist of one Physician, rank of Surgeon: dependent duties, to attend to all medical case

SERIES V. SECTION IV. admitted. One Surgeon: dependent duties, to attend to all surgical cases admitted. Date of commission to define the respective positions of these Officers.

2nd.—Medical Storekeeper: dependent duties, to attend solely to the Department of Medical Stores.

3rd.—Superintendent of Eye Infirmary and Lunatic Asylum.

4th.—Garrison Surgeon to have charge of the Chintadrepett hospital, Vaccine Department, Body Guard, all sick Officers at the Club, the Club Chambers and Hotels, &c., within an area of half a mile on every side of the Club.

5th.—Surgeon in charge of Lying-in-Hospital and Penitentiary.

6th.—Surgeon, 1st District.

Bounded on the north, south, and west by Cochrane's Canal; on the east by the Hospital bridge, and thence skirting Black Town to the sea, comprising the following districts, Toondiarpett, Coorookapettah, Washermanpettah, Uttapallium, Royapoorum and Black Town: dependent duties, Black Town, Native Infirmary, Leper Hospital, Emigration and all Government servants residing within his district.

7th.—Surgeon, 2nd District.

Bounded on the south by the Poonamallee road to Law's bridge; on the east by the branch of the Cooum river and Cochrane's Canal; and on the north by Cotton's Canal, comprising the following districts, New Town, Vepery, Choolay, Veeranasthum, Pursewakum, Kilpauk, Perambore and Vyaseerpaudy: dependent duties, Female Asylum, Vepery Dispensary, Powder Mills, Gun Carriage Manufactory, and all Government servants residing within his district.

8th.—Surgeon, 3rd District.

Bounded on the west by Nungumbaukum and Mylapoor tanks as far as the Cenotaph, thence to the Adyar and down to the ruined bridge, including all to the west of Mowbray's road as far as Royapett and the Thousand Lights, all to the north-east of the Mount road to Government House, and on the west bank of the Cooum to Law's bridge, and on the north by the Poonamallee road, comprising the following Districts, Chetputt, Egmore, part of Chintadrepett and Nursingapoorum, Poodoopett, Nungumbaukum, part of Royapett, part of Alvarpett and the Adyar: dependent duties, Male Asylum Dispensary, Mounted Police, and all Officers residing within his District.

9th.—Surgeon, 4th District

From the Marine Villa to the south, so as to include the Bungalows beyond the Adyar, and embracing the space from Government House, south-east of the Mount road to the Thousand Lights, from thence to Royapett by Mowbray's road to the ruined bridge on the Adyar, comprising the following districts, Chepauk, Triplicane, Theroovateswaren pettah, Poodoopaukum, Kistnampett, Meersaibpett, part of Royapett, Mylapoor and the Adyar: dependent duties, Triplicane Dispensary and Police.

10th.—Garrison Assistant Surgeon.

Tho Assistant Surgeon of Fort Saint George to have supervision over all, not included in the above districts, from the east bank of the Cooum river, opposite the Marine Villa, to the General Hospital bridge, and from thence northward and eastward, skirting Black Town to the sea: dependent duties, Garrison of Fort Saint George, Port and Marine Surgeon, in charge of 1st Native Veteran Battalion and Madras Sapper Militia. I beg to forward a map of Madras, and its suburbs, wherein the proposed re-distribution of duties are marked out.

MADRAS, 8*th August* 1859.

SERIES No. 6.

CEDED DISTRICTS.

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SERIES No. VI.

CEDED DISTRICTS.

SERIES VI. Topographical sketch.

The Ceded Districts are divided into three Collectorates, Bellary, Cuddapah, and Kurnool. This division is bounded on the north by the Tumbudra river, which separates it from the Nizam's dominions; on the south by the north division of Arcot and Mysore; on the west by Mysore; and on the east by the Collectorates of Nellore and Guntoor. The province forms part of the table-land between the east and west ghauts. The elevation of Bellary is 1,600 feet above the sea. Kurnool again to the north has an elevation of 900 feet; the surface slopes towards the south-east. The average elevation of the plain from Bellary to Gooty is 1,180 feet, and it sinks rapidly at Cuddapah, which was for many years the capital of an independent Pattan State, and many old Pattan families still reside there.

SECTION I.

Cuddapah.

Section I. Cuddapah Hill ranges.

The several ranges of hills pass under various names. Those to the eastward are denominated the Nulla and Lunka mallas; while those to the westward are called the Soondoor and Kample ranges. Their formation is grey slate, sand-stone, quartz, blue and grey lime-stone and silicious schist. Near Chinnoor, seven miles from the town of Cuddapah, on both banks of the Pennar river, which here washes the base of a hilly range, are the once famous Diamond mines, which were worked for centuries, and in which stones of considerable size were found. A blue lime-stone embedding iron pyrites, occupies a large portion of the plain of Cuddapah. The hills around Cuddapah vary in height from 1,500 to 1,800 feet above the sea. But there, at a point seventeen miles in a straight line from the town of

SERIES VI. SECTION I.

Cuddapah in 14° 14' north latitude and 78° 76' east longitude, they attain an elevation of 2,300 feet above the sea level. Captain Stewart, the District Engineer, who was the first to bring this range to notice, and who resided on the summit for some days, states, "that the climate there, "is as bracing as at Bangalore, the thermometer ranging at the end of "the month of January from 45° to 69° in the twenty-four hours." He further states, that the inhabitants on these hills assured him that fever is unknown there throughout the year. During the month of August, the Collector of the District proceeded to visit this hill. He was accompanied by Iyasawmy, the intelligent Native Surgeon of the place, from whom I have received the following information regarding it. The most direct road and easy ascent from the station of Cuddapah, is from the village of Goolcherroo; the ascent is easy. On the summit is a table-land three to four miles in circumference. Partial cultivation and some jungle on the summit. The inhabitants are called Zonnadies and reside in hamlets of from three to ten houses. They appear a robust race. They assert that fever is unknown on the hill, and neither young nor old show any indication of being prone to the disease. None of the party who accompanied the Collector on this occasion suffered in any way, although it rained constantly during their stay on the hill, and they were repeatedly in wet clothes. The surface of the plateau is kunker, capped with a rich mould. Cultivation is carried on to some extent, and there was a free supply of water from wells and small streams. The thermometrical ranges were as follows:—

At 6 A.M.	At 10 A.M.	At 1 P.M.	At 4 P.M.	At 6 P.M.
70°	74°	75°	72°	70°

and the nights were pleasantly cool.

Climate.

The station of Cuddapah has long maintained a bad reputation for insalubrity. From February till July the atmosphere glows intensely, rapid evaporation takes place. The air is at times perfectly calm, interrupted by occasional light breezes during the day, which fail altogether at night; and the heat of the still atmosphere becomes increased by radiation from the neighbouring hills, which form a screen, intercepting ventilation. It is impossible to sleep comfortably within doors at this season, and even in the open air the nights are passed in a feverish and restless state. Even when the hot winds set in, they generally after sun-set fail altogether. In the month of September, when I visited the place, the muggy and oppressive feeling of the atmosphere exceeded anything I have ever before experienced. The station is quite in a basin

SERIES VI. SECTION I.

The hills around are distant from three to twenty miles, and exercise a most injurious influence on the health of all who reside within the space, both European and Native. Fever is the great and prevailing disease; recurring attacks and complications being certain, unless the party be removed from the district. Cholera is also an epidemic annually. About sixty miles south-west of Cuddapah is the high table-land of Muddenpully, the station of the Sub-Collector. It is close on 2,000 feet above the sea. It is a salubrious spot, and forms an agreeable retreat from Cuddapah, to which it exhibits a delightful contrast both in climate and scenery. The temperature here seldom exceeds 87° during the day; the nights are refreshingly cool; and the place abounds in fruitful gardens, producing grapes, peaches, strawberries, apples, guavas, &c.

Civil Dispensary.

This building affords but indifferent accommodation for the number who apply for relief there. Last year 4,018 applied for relief, and up to the 31st August this year, upwards of 3,000 have already resorted to the institution. In the months of April and May cholera prevailed; fifty-nine cases were admitted into hospital, of whom seventeen died. The Native Surgeon does much good. He has the confidence of the community, and is in constant attendance on the more respectable families in the town. He has a class of female midwives now under instruction. He is very highly spoken of by the Medical Officer of the station, under whose controlling authority he prescribes for all ordinary admissions into the Dispensary; the only true mode by which he can keep up a knowledge of his profession, and become acquainted with the community, and do justice to those amongst whom he is placed.

Jail.

The Jail stands nearly in the centre of the position once occupied by the old Fort. It was erected in 1813, and consists of several buildings adapted for various classes of prisoners, the space being surrounded by a wall 12 feet high. The cells are built entirely of mud and placed dos-a-dos. In length they vary; but the breadth of each does not exceed seven feet, the height being almost the same, and the basement is on a level with the surrounding ground. The wards are enclosed in front with strong open wooden bars, affording abundant ingress for air; but the only means provided for the escape of the foul atmosphere, generated within the building, is by an aperture at the gable end of each ward which contains perhaps sixty to eighty prisoners. The current of foul air also circulates over the upper part of the wall separating each cell, which is open at the top. Thus each cell is made to add to the impurity of

the other, a cause in itself sufficient to account for the high rate of mortality which, according to Superintending Surgeon Eyre, has affected the prisoners incarcerated within this building for the last thirty years.

But in addition to this there are other self-evident exciting causes of disease both within the jail area and immediately without the building. Within, the space enclosed by the high wall is much too cramped, and free circulation of air is retarded by the presence of long ranges of cooking sheds opposite and close on the cells, where each prisoner has a compartment *for his own special use.* In the walls of each ward are apertures for the escape of urine by a tube which passes outside the building; but as the walls are "cutcha" built, the urine has percolated into them, and now they have become saturated with it for several feet on each side of the tube. A net work of open chunam drains intersect the space in every direction, for the most part they pass down the narrow passage between the cooking sheds and the sleeping wards. The whole sewage within the area is thus necessarily exposed and pollutes the atmosphere as it passes slowly along. When I visited the jail, the smell was perfectly sickening, and the Surgeon informed me it is almost always so. One of the most unhealthy parts of the jail is the spot where this sewage, after it has passed through the greater part of the area, is about to find exit without the high wall.

Without, separated from the jail area by a wall, is an enclosed space where the prisoners proceed for the relief of nature, and a more horrible place cannot be conceived. I was informed that the accumulated ordure is removed from there to a distance by hand carts. But the only scavengers I observed at work on the spot were buffaloes and pigs. The stench here was horrible, and a window from a compartment of the hospital looks into this space. The mortality amongst the prisoners is observed to proceed from Wards Nos. 3, 4, 10 and 11, which are either exposed to the currents as they pass over this abominable spot, or, as already remarked, are exposed to the sweepings descending the common sewers within.

The average strength of the prisoners has been 403. The chief diseases, which afflict the prisoners, are fevers of various types, all with pectoral complications, a symptom in itself affording a strong indication that the exciting cause of the disease is impure atmosphere; the more so when we find that in the adjacent Cantonment, where fever is also most prevalent amongst the sepoys, no similar complication exists.

The following table exhibits the classes of diseases treated during the past official year. SERIES VI. SECTION 1.

Fevers.		Diarrhœa.		Dysentery.		Cholera.		Other diseases.		Total.		
Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Strength.
226	12	29	10	17	3	26	19	157	1	455	45	407

Superintending Surgeon Eyre in his report gives the following contrast of the sanitary state of the Jails within his circle.

	Bellary.	Kurnool.	Cuddapah.
Per cent. of sick to strength..	61·55	127·13	128·74
Do. of deaths to do. ...	5·16	4·60	12·77

There has been an excess of deaths last year in the Cuddapah Jail of twelve over the preceding year, and thirty-one over the year before that, and the largest number of sick, as well as deaths, has been amongst the recently incarcerated. Cholera appeared in an epidemic form in March and April.

Having now in accordance with the instructions of the Director General, under date 11th August, pointed out the causes of the high rate of mortality in the jail at Cuddapah, I will offer some suggestions on the best mode to arrest this.

1st.—I recommend that the walls of each sleeping ward be raised to double their present height, and that the roof be provided with ridge ventilation.

2nd.—That the intercepting wall, separating two lines of narrow cells, be removed, and the very admirable plan substituted, which has been adopted in the jail at Nellore, of raised sleeping places, with free ingress for air underneath, and a separate detached apartment as a privy.

3rd.—That the prisoners be obliged to mess in gangs, thus enabling half the present cooking places to be dispensed with.

4th.—That the flow of the sewage, which now passes by a net-work of drains around the jail area, be checked in its course by the formation of direct passages to the point of exit, and that it be not permitted to run into the river on which the inhabitants in a great measure depend.

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5th.—That a new spot in a more remote locality be marked out as a place of resort for the prisoners; the present locality being converted into a vegetable garden and brought within the jail enclosure.

I am perfectly satisfied that no improvements short of what I now urge, will be attended with any permanent advantage to the health of the prisoners. There is nothing objectionable in the site occupied by the jail, and I have little doubt, if the improvements, now urged, are carried out, its sanitary condition will bear comparison with any other jail.

3rd Extra Regiment N.I.

When the 3rd Extra Regiment was stationed at Arcot some months since, I inspected and reported on it. Since their arrival at Cuddapah, fever has afflicted them very severely, and there has been a daily average of seventy on the sick list. The jail fever and the cantonment fever are totally distinct in character. The former is almost invariably accompanied with pectoral complications, while in the latter slight head symptoms mark the progress of the disorder. In the jail, on an average strength of 392, the mortality, for the twelve months preceding my inspection, from every cause was forty-nine; while in the Regiment, on an average strength of 1,015, the deaths within the same period have only numbered nine, which includes four men who died out of hospital. I beg to recommend that another Medical Subordinate be appointed to the 3rd Extra Regiment, for the sick list is very large, and it increases as the colder months set in.

SECTION II.

Nellore.

Section I.

This Collectorate is in the Centre Division, and is the capital of the division of the same name. It is situated on the right bank of the Pennar river, eighteen miles from the sea. The population numbers 24,000, the majority being Mahomedans. The town stands well on lateritious soil, and the country around is well supplied with water from tanks and wells. There are also extensive rice fields from this spot to the sea, copiously irrigated from tanks and canals cut from the river. The residences of the Collector and the Chief Military authorities are south of the town; and the climate of the station is considered salubrious.

Garrison Hospital.

This is a good building, and ample for all the wants of the place. There are occasionally a few sepoys on sick leave under treatment, and Europeans and others connected with the Public Works Department. There is a

Detachment of the 2nd Native Veteran Battalion stationed at Nellore, which furnishes a monthly guard to Woodiagherry, a hill fort on the west part of the district, fifty miles from Nellore, and placed half way up an elevated plateau of some extent, on the range of hills dividing the Cuddapah and Nellore districts, the summit of which is said to attain an altitude of 3,000 feet above the level of the sea. The average sick actually under treatment out of the Detachment of Invalids is not large; although the men have a worn-out appearance, they are equal to the light duties they are called on to perform.

Jails.

The jail consists of a double range of buildings forming two distinct squares enclosed within a wall, eleven feet high. The hospital is a line of building in the same enclosure, extending across its whole breadth at the southern part. It is well raised, airy, and divided into three wards, with Dispensary attached. It is also provided with a double verandah, and is calculated to contain fifty to sixty patients. Roof ventilation is all that it requires to make it an admirable hospital. The more modern part of the jail itself is about the best I have seen within the Presidency. There is nothing grand or expensive in its structure. It consists of cells of different lengths, with breadth sufficient to admit of a passage of 3½ feet between the prisoners, as they lie on each side of the cell. The building formerly resembled one of those ill-ventilated wretched apartments, which I have in former reports described. The walls are now elevated. Chutries raised 18 inches are ranged the length of the cells for the prisoners to sleep on. Free ingress for fresh air is secured through grated openings from without, passing under these chutries, and by means of ridge ventilation above, a ready escape for the foul air is also provided. A small room is attached to each ward, flagged with stone, in which two apertures are made, large earthen vessels being placed underneath during the night to receive the urine and fæces of those incarcerated within; an admirable improvement over the former state of matters, and one which can be introduced into all our jails at very small cost. There is an ample supply of good water within the jail court.

There are now 318 prisoners confined in this jail, and only six on the sick list. Fifteen deaths took place last year, two being from cholera.

The Civil Dispensary.

This is an excellent building well raised and ventilated. During the past official year 4,203 sick applied for relief, a reduction of 1,200 upon that the preceding year. This, the Medical Officer accounts for by the ready employment which the Public Works Department affords to

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the poor, and their much better condition in consequence. On the morning of my inspection, there were thirty sick in hospital, the average daily treated during the year being about seventy. The prevailing diseases are fevers, syphilis, and the concomitants of the latter.

Vaccination.

In this Collectorate the vaccination has been attended with much success. It is entirely under the Surgeon and not as in most other places in part subject to his directions and in part to those of the Collector. In 1858, 14,907 were vaccinated; of whom 13,605 are considered to have been successful. The lymph is kept up within the district with much purity.

SECTION III.

Guntoor.

Section III.

The town of Guntoor has a population of 25,000, and is the capital of the Collectorate of the same name. It is forty miles from the sea, and eighteen from the river Kistna. Towards the coast the country is flat and open; but a few miles to the south-west there is a range of hills. One of these, fifteen miles from Guntoor, called Condaveed, rises nearly 2,000 feet above the sea. Here there is a bungalow, an ample supply of water, and it is an agreeable place of resort for the European community during the hot season. The town is divided into the old and new town. Of late it has been much improved and is considered remarkably healthy. The soil around is black cotton, and produces luxuriant crops of chenna, cholum, and cotton.

Jail.

The jail is about a quarter of a mile from the town, on an open, dry, slightly-rising ground, and surrounded by a wall fourteen feet high. It consists of several buildings in separate areas, divided from each other by walls eight feet high. The buildings are of brick, pent-roofed, and tiled. The sides of the buildings are open frame-work, permitting a free current of air through the cells, which in bad weather are closed by tats outside. There is no roof ventilation, nor are the floors raised. There is an ample supply of good water within the walls, and the out-houses are conveniently placed. The solitary cells are not fit for human habitations; there is neither ingress for air below, nor roof ventilation above. The hospital is a very wretched building; great mud pillars at intervals of three feet support the roof of an apartment

not above ten feet in breadth. A heap of mud erected in form of a bed is placed at short intervals through the wards on which the sick recline. There is no ingress for air from below or egress for it above, and the accommodation for Surgery is very poor. All this can be remedied at a very small cost, either by supporting the roof with strong wooden pillars, or by putting a new roof on the building with ridge ventilation adapted to it.

The jail in this Zillah has been for years one of the most healthy within the area of the Madras Presidency. At present out of 142 prisoners, only three are on the sick report, and two deaths only took place last year. The improved privy system in force in the jail at Nellore, might be introduced into this jail with much advantage.

Garrison and 2nd Native Veteran Battalion Hospl.

The number of men of the 2nd Native Veteran Battalion, stationed at Guntoor, is 217. With roof ventilation, their present hospital is in all respects a sufficiently commodious building. The Surgery is however much too cramped, and is used as store-room and dispensary. Sixteen sick Veterans, and four from effective Corps, are on the sick list. The prevailing diseases of the Veterans are those incident to old age, and worn out frames; such as debility, rheumatism, affections of the eyes, and paralysis. The other sick of the Garrison are men of effective Regiments on sick leave, or en-route to join.

Civil Dispensary.

The Dispensary is much resorted to by the native community in and around Guntoor. Last year the average of daily sick in and out-patients, was fifty-five. On the morning of my visit fifty-nine were prescribed for. During the past year 3,625 sick applied for relief, which is an excess of 440 over that of the previous year. The deaths during the past year were seven; and the prevailing diseases are syphilis and its concomitants and bowel disorders. The building occupied as a Dispensary is a wretched native hut, not worthy of being called a hospital. Funds for the erection of a suitable hospital have some time since been collected; the foundation of the building was laid and much of the materials were collected on the spot; but three months since the works were suddenly stopped, pending the decision of Government, on the purchase of other property for the use of a Cutcherry, and the conversion of the present Cutcherry into a Dispensary. The site which has been selected for a new Dispensary, the foundation of which is now above ground, is well suited for the purpose. I beg to urge that the building be proceeded with without further delay. The money collected for its construction is, I am informed, deposited in the local Treasury.

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Section IV.

SECTION IV.

Ongole.

The hospital at this out-post is of recent construction. It is well raised and well ventilated; but it requires a cook-room. Occasionally there are European sick, either of the Public Works Department, or others, when difficulty is experienced in preparing their food, hot-water, poultices, &c. There are five sick now in hospital, old and worn-out men who do not appear to be fit for further service.

SECTION V.

Cumbum.

Section V.

This out-post is midway between Ongole and Nundial; the latter being the proposed position for the Court House and central jail in the district of Kurnool. Here is one of the finest artificial lakes in this part of India, which irrigates and fertilizes the land around for miles. Originally a stream of some magnitude passed through a gorge between two hills; this was closed up, the bund being in one place eighty feet in height, thus forming a vast sheet of water, containing several rocky islets surrounded by an amphitheatre of picturesque hills, and occupying an area of forty miles in circumference. This celebrated lake was formed, it is stated, in A.D. 1336, contemporaneously with the erection of the ancient city of Beejanuggur, forty miles from Bellary; the ruins of whose magnificent temples form one of the grandest sights in Southern India.

Detachment 2nd Native Veteran Battalion.

The Detachment garrisoning Cumbum consists of 124 Veterans. I found three in the building set apart for a hospital, which is not deserving of the appellation, it being a narrow ill ventilated apartment capable of containing six beds, without either cook-room or bath-room, and situated close to the putrid water of the old Fort ditch. The men's lines are also in this locality, and both they and the Officer Commanding the Detachment complained to me of the offensive effluvia which arise from this stagnant water. It would be easy to fill up the ditch by throwing and levelling the ground around.

SECTION VI.

KURNOOL.

Topography.

In reference to the surrounding country, the town of Kurnool is placed quite in a hollow. It is the lowest part of the district, its elevation being nine hundred feet above sea-level, and occupies a narrow tongue of land which separates the confluence of the Hindree and Tumbudra rivers. The part where all the Officers reside is in some parts lower than the bed of the river, and it is impossible to secure drainage from the town from this circumstance, and from the fact that the banks of the streams are somewhat higher than the space on which the town stands. As regards sanitary considerations no position could be worse than this for the habitation of man. The population of the city may be reckoned at 23,000 persons, half of whom are Mahomedans, and all are massed together in a contracted space in this low locality. The Officers of the force occupy houses constructed on the circular bastions of the old Fort, beneath and around whom on every side are the dense population amongst whom syphilis of a very malignant type, fever, small-pox, ophthalmia and cholera are always present. When cholera makes an inroad into the city, it works fearful havoc. The last outbreak in May and June last, carried off four Europeans out of the small European community, forty-one out of the Regiment, and close on 2,000 out of the town. From the superficial nature of the soil, which lies upon limestone and trap at a depth of seldom more than eight or ten inches, the interment of the dead is of a very unsatisfactory nature, and the effluvia proceeding from the cemeteries is very oppressive and destructive to health. The European community have always one or more graves open, excavated from the rock below, ready to receive the first unfortunate victim to disease. This precaution is adopted as it takes days to excavate a grave to the proper depth. But when, as recently occurred, four of them were carried off in the space of a few days, I am informed that it was hardly possible to convey the dead in the same locality, the stench was so fearful.

Climate.

The climate of Kurnool beyond the town is considered healthy though hot; the ground gradually rises from the river, and about a couple of miles from the confluence of the streams to the west is a favorable position on red soil (the country around being entirely black), which His Excellency the Commander-in-Chief selected for the military cantonment; and I beg to add my recommendation to that of His Excellency.

Nundial.

Nundial has been selected as the position for the Court House, Jail, and residence for the Sudder Judge, on account of its central position in the district, Kurnool being at one extremity. It is a singular circumstance that the extensive bed of limestone before adverted to, found for thirty to fifty miles on every side from Kurnool, disappears at Nundial. For miles around this village, at the greatest depth yet attained in sinking wells, there is nothing but the rich regur soil. It is asserted that it is from this cause that the water in the tanks in this neighbourhood so speedily percolates into the soil. From this fact, and also from the low nature of the country around Nundial, I have not formed a favorable opinion of the locality in a sanitary point of view. I am inclined to give the preference to Yelligode or its neighbourhood, which is about thirty miles north of Nundial. Mr. Arbuthnot, the Collector, and others who are familiar with this locality are also of opinion that it is the most favorable spot in the district of Kurnool for a station. From here the water-shed of the district flows; it is in proximity to an elevated range of hills, the salubrity of which has already been proved; it is close to the great line of operations projected by the Irrigation Company about to connect Madras with the Kistna river, and I believe it is also on the new line of road proposed from Bellary to Secunderabad. Sanitarily considered, therefore, Yelligode or that neighbourhood appears to me to be the best position for a station, Civil or Military, or both. Its elevation above the sea is about 1,000 feet higher than Kurnool.

Geology.

The prevailing soil of the district of Kurnool is the regur or black cotton ground, lying on limestone intersected with trap dykes. The soil in few places is above a foot in depth for miles around the town of Kurnool. In the vicinity of the hills the limestone disappears, and beneath the subsoil the rock is standstone or conglomerate. The hills in parts of this district are rich in minerals. Galena and ores of copper and iron abound. Diamonds have been found in many parts of the district; and the mines in the neighbourhood of the town of Bangapilly are still rented by Government. They are situated in a low range of hills. The matrix of the gems is a sandstone breccia, lying under compact sandstone, of which the hills in the neighbourhood are composed. This breccia is a mixture of colored jasper and quartz, cemented by a silicious calcareous earth, of a loose friable texture. This gravel is broken up, washed and sifted, and the diamonds are easily detected; but none of any value have been discovered here for many years.

Mountains.

The extensive chain of Nulla mulla mountains, which are clothed with luxuriant vegetation, dense jungle, and forest trees of large dimen-

sions, separates the Ceded Districts from the ports on the eastern Coast. A bandy road is now under construction viâ Cumbum over the Nundi Cunnama pass, which must greatly increase the intercourse and prosperity of the country. Yerranachellum is the most elevated point on this range of hills; its elevation being 3,200 feet above marine surface. The Collector has a house on the summit. In the hot season the temperature in the shade ranges from 76° to 86°; In the cold the range is 15° to 20° lower. On the summit the plateau is about 400 yards square; but in the neighbourhood at less altitude there is abundant land for building purposes. Coffee and European fruits and vegetables grow luxuriantly, and there are good perennial springs around. Europeans have resided on the summit at all seasons for months, passing much of their time in field sports (for the forest abounds with game) without any evil results to themselves or their servants. This is another proof of the correctness of the views I have formerly advanced; that the application of the term "fever range" is an arbitrary style of reasoning. My inquiries satisfy me that fever is due to other causes than elevation above or beneath a certain altitude, and it is perfectly practicable to remove many of these exciting causes. The term "fever range" is a convenient one in general use, which has sprung up to account for certain circumstances supposed to be beyond our comprehension; but I feel persuaded that the application of this term in the sense it is now used is erroneous. I would only instance the colonization of the Island of Ceylon by hardy British planters at any elevation; that of the Wynad, the slopes of the Neilgherries, the Pulneys, the Shevaroys, Coorg, and the highlands of Mysore, as proof of the correctness of my views.

36th Regt. N. I.

The 36th Regiment Native Infantry is 900 strong, and sixteen are sick in hospital. The hospital is an admirable building in every way, but situated at the lowest part of the fort. Immediately beyond the building to the west, there is broken ground to the beds of two rivers, this and the glacis of the old fort obstruct free circulation of air. Cholera appeared epidemically in May and June last; including followers 119 were seized with the disease in the Regiment, forty-one of whom died. The Regiment otherwise have been healthy

Jail.

In the jail I found 118 prisoners and five sick. The space in front is provided with open bars of wood which admits free circulation. The prisoners have ample room, and a robust healthy appearance. They are exceedingly clean, and there is no itch amongst them; but the very objectionable practice exists here of the introduction of chatties at night into the wards for the purposes of nature. The building is only used as a tempo-

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SECTION VI.

rary arrangement. Both the Judge and the Medical Officer represented to me the inconvenience of the want of a Medical subordinate to the jail, the individual who does duty there, being detached from the Dispensary where he has other important duties to attend to.

Civil Dispensary.

The Civil Dispensary is a building of modern construction, placed immediately beyond the walls of the fort; a separate apartment for cholera or small-pox patients being attached to it. The ground is broken and full of pits; these and the dung-ditch also contiguous are receptacles for filth, which renders the spot very offensive. Ophthalmia, fever and syphilis are the prevailing diseases. The Kurnool Irregular Horse receive relief when necessary at the Dispensary.

SECTION VII.

GOOTY.

SECTION VII.
One Company 30th Regiment N. I.

The garrison of this post has hitherto been furnished from Bellary, but it is about to be relieved by the 2nd Extra Regiment now stationed at the cantonment of Cuddapah. I found only two sick in hospital, and the men have been healthy since their arrival. Two European Officers are attached to the detachment. The hospital is a spacious apartment, placed immediately under the hill fort. It is nearly a mile from the barracks, and to reach it the town of Gooty has to be traversed; the barracks being in front of the esplanade outside the town. A choultry for travellers has been constructed at Gooty to the memory of Sir Thomas Munro, who died of cholera a short distance hence at Putticonda on the Adony road. The building is placed near the junction of five roads, viz., the Kurnool, Bellary, Bangalore, Cuddapah and Putticonda. To this a dispensary under charge of an Apothecary is attached. It is much resorted to, and is of essential service both to the community and to wayfarers. The Dispensary is exceedingly dark and contracted in space, it being merely a small portion of the verandah of the spacious building, closed in without inconveniencing those who resort to the charity. A large portion of the building might be set apart for this purpose. Cholera now prevails in the town. Indeed, this malady with fever and ulcers are the prevailing diseases of the place. The most elevated part of the table-land of the Ceded Districts, is a space on the road from Kurnool, ten miles from Gooty. The declination from the Mysore plateau at Bangalore may be reckoned at ten feet per mile, until this spot is reached, when the ascent again begins.

SECTION VIII.

Bellary.

SERIES VI. SECTION VIII. Topography.

The head-quarters of the Ceded Districts, is 1,600 feet above the level of the sea. The aspect of this Collectorate is generally flat and open, but numerous isolated mountains of granite are scattered over it, and it is intersected by many lower ranges of hills. These hills are composed of huge boulders, grotesquely heaped up in irregular masses from the base to the apex. Most of the open is a rich black regur ground, but near to the hills it is of a deep red. The products of the black lands are cholum, millet, and cotton. The Castor-oil plant, with the various kinds of pulses, are chiefly cultivated in the red. Rich crops of rice, sugar-cane, &c., are also reaped in all places where water is procurable for irrigation; and there are some fine tanks in the district. From the scarcity of trees the country has a sterile appearance; but shortly after the first fall of rain the plains are converted into vast fields of luxuriant vegetation. The common indigenous trees are the babool, the bear, the white date, and the beel tree. The babool, or gum-arabic tree, is chiefly met with along the banks of nullahs, and it is also found on the plains. The beel resembles the wood-apple, and its fruit is used by the natives in bowel complaints from its astringent properties. An excellent quality of iron is made in many parts of the district; the chief manufacture being in the neighbourhood of Sundoor. Copper, lead, and antimony ores are found on the hills, and native salt and saltpetre abound in some soils.

The principal ranges of hills are the Yerra mulla on the north-east frontier, and the Kampli and Sundoor on the west. A spur from the Sundoor range runs along the south side of the cantonment of Bellary for about eight miles, when it abruptly terminates. A high point in this range called the Copper mountain is opposite the fort of Bellary and within four miles of it. The height of summit above cantonment is 1,200 feet; but there is no water, and the space of table-land on the top is very limited. The copper ore found here is the green carbonate in the state of clay, and excavations are still to be seen—the remains of the mines from whence ore was extracted.

The climate of Bellary is characterized by the extreme dryness of the air, in consequence of the air passing over such an extent of plain. The fall of rain is less than in any other part of India. Dews in general are light, and last but a short time, and there are no heavy fogs. The winds blow principally from the west and north-west from March to November, and from the east and north-east the remainder of the year. The hottest

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part of the year is from March to the end of May; the wind then lulls towards sun-set, and there is an oppressive calm all night; towards morning this feeling of oppression passes off, and the air is invigorating until two or three hours after sun-rise. The thermometer ranges from 96° to 100° in the shade up to the end of September; after this the climate becomes very refreshing, and the temperature falls at times below 50° in the open air.

Cantonment

The Cantonment of Bellary is the head-quarters of the Civil and Military departments of the Division. The plain around is flat and wholly destitute of jungle. The station occupies a somewhat elevated spot, and the ground slopes in all directions from the fort, so that no water lodges in the neighbourhood. Many of the springs as well as the soil, are impregnated with muriate of soda and carbonate of lime. In the immediate proximity to these, a spring of fresh and good water may be found; this is ascribed to the almost vertical strata through which they rise.

The rock on which the fort of Bellary stands is composed of granite and gneissiform granite; its eastern and southern sides present a bold aspect, declining gradually towards the plain; on the opposite sides masses of loose fragments are irregularly piled on one another. Until recently the entire European force were accommodated in barracks within the lower fort; now the Artillery alone occupy the fort, commodious and admirably constructed barracks having been erected on a high and dry plain for the European Regiment of Infantry. The only things wanting to render the barracks complete are married men's quarters; the families being now accommodated in small apartments at each end of the barracks. On the south side of the fort about 100 yards from the rampart is a large tank. This is the only appreciable source from which malaria can be supposed to arise. When full, it is about three miles in circumference, but being for the most part extremely shallow, it is soon reduced during the dry season. In its half-dried state various exhalations issue from it. A smaller tank on the south-west side of the fort, which is filled by the rain as it descends during the monsoon from the upper fort, always contains a good supply of water, and is the source from which the garrison and the inhabitants are supplied with water for domestic purposes.

The exposed bed of the large tank is the place of resort for natives residing in the pettah, in Bruce and in the Cowl bazar. In the last named locality, which is close under the walls of the fort and contiguous to the Cavalry lines and residence of some of the European Officers, is a distillery and tannery, and the refuse drainage from these passes away to the exposed bed of the tank. This is the filthiest spot in the cantonment; there

is no attempt at drainage; indeed from the irregularity with which the houses have been permitted to spring up, drainage is impossible. The place is also the abode of the lowest order of prostitutes. Further on, within half a mile of the fort, and indeed from the Cowl bazar to the supply channel of the tank, there are quantities of prickly-pear, and the space is dreadfully filthy. To correct this very objectionable state of matters, I would recommend that public latrines be erected (similar to those which have proved so efficacious in the town of Madras) in convenient localities. That the distillery, tannery, and slaughter-houses be removed to a distance, and that the streets in the Cowl bazar be so laid out that effectual drainage can be commanded. It is in this locality that cholera always begins and always ends.

Medical Store Department.

A portion of the barracks formerly occupied by the European troops in the fort is now given up as apartments for Medical Stores and a hospital for the accommodation of the sick of the garrison. The medicines in store are alphabetically arranged and carefully preserved. Tinctures are supplied from the Presidency Medical Stores in imperial pint bottles. Medical Officers frequently ask for a few ounces more or less than this quantity. It would be attended with convenience to the department if instructions were issued directing that the annual requisitions be restricted as nearly as possible to the above quantity, or such exact multiples of it as may be necessary.

Garrison and Artillery Hospl.

The Garrison and Artillery sick are treated in one hospital. Europeans and Indo Britons together, and natives separate. The strength varies; the prevailing diseases are venereal and dracunculus. There is free space in and around the hospital, and the building is provided with roof ventilation. I found the surgical instruments and appliances in good order, and the books brought up, and the medicines correctly labelled. The Garrison Surgeon represented to me that the hour at which Committees (of which he is a member) sometimes assemble, interferes with his morning duties, and he suggests that instructions be issued to assemble Committees, of which a Medical Officer is a member, at such other hour of the day, as shall not interfere with his morning duties as laid down by regulation. The suggestion is, I think, a reasonable one.

Civil Dispensary

The Civil Dispensary occupies a favorable position at the extreme end of Bruce pettah, an open and healthy spot. The building is too small for the wants of the place. I found thirty in, and eighty-five out-patients on the occasion of my inspection; and since the arrival of Garrison Surgeon Forbes at the station, this appears about the daily average of sick treated.

SERIES VI. Section VIII.

The following table exhibits the gross number, who applied for relief during the past five years.

Years.	In-patients.	Out-patients.	Total.
1855	112	1,845	1,957
1856	99	3,664	3,763
1857	56	3,545	3,601
1858	58	2,939	2,997
1859 (from January to Sept.)...	146	2,683	2,829
Total...	1,027	20,556	21,583

Out of the thirty in-patients, twenty-two are syphilitic cases in females. Prior to the arrival of General Coffin to command the Division, this loathsome disease had proceeded unchecked, and had reached an alarming height, both European and Native soldiers suffering from its effects in its worst form. But by the introduction of vigorous action within military limits, and cordial co-operation with the Civil authorities it has considerably abated.

Jail.

The jail is situated on a high and dry site to the eastward of the fort. I found 445 prisoners incarcerated, of whom eleven were sick, their diseases being of a trifling nature. The average number of prisoners for the year is 619, and for that number the accommodation would allow about 200 cubic feet to each man. In 1858-59, the total deaths were thirty-four, ten being from cholera. The hospital is in a separate enclosure, and both it and the prisoners' cells are provided with roof ventilation and iron barred doors and windows which give free ingress of air to the cells, of which there are forty-one in all. The food supplied to the prisoners is excellent. The hospital appliances and medicines are in good order, and the books are kept up.

H. M.'s 74th Highlanders.

As already stated, new European barracks, on the most approved plans, have lately been built on high ground, about a mile west of the fort. Each block contains a Company, with apartments for Serjeants and married Privates at each wing. The buildings are admirably ventilated, and the men have ample accommodation; but the end apartments are too cramped for a married man with a family. This however it is intended hereafter to remedy by the erection of married men's quarters. The sick are temporarily accommodated in one of the barracks, in which by appropriating the verandahs there is abundance of space for seventy to eighty cots. The new hospital now in course of construction will be a magnificent building of two stories, it is calculated to accommodate seventy men in each, besides women and children. It appears to me, however, that in the construc-

tion of the interior arrangements of the building, too much regard has been bestowed on appearance, and too little attention paid to the future comfort of the sick. I have gone over the building carefully with the Surgeon of the 74th and with the Engineer in charge. Both Officers entertain the same views as I do, and the Engineer informed me that he was obliged to work out the exact plan furnished to him. My objections are—

1st.—That there will not be one spot in the entire building where the patient can escape a current, for the only ingress for air is by the doors, and as there is no egress provided for the foul atmosphere to escape above, some of these doors must remain open day and night to admit fresh air and to permit the escape of that generated within.

2nd.—That much and unnecessary space is sacrificed in the inner apartments for the sick, by the introduction of spacious open arches in the wall which separates it from the outer verandah, and that the plan proposed of placing four beds around the pillars supporting the roof in the centre of the wards, would be fatal to the lives of patients under the influence of sudorific medicines, or suffering from visceral diseases, from the current to which they would be exposed. Folding doors in some of those arches, open above, would remedy this defect.

3rd.—That the means provided for ventilating the upper apartments should be enlarged and placed under the control of the Surgeon, so that they may be opened or closed at pleasure. All ventilating apertures in roofs fitted with windows which are opened and shut by means of cords should be sloped or rounded below, otherwise the sharp edge of the wall below speedily cuts the cords.

4th.—That the space proposed for a Dispensary for the establishment is far too small; it is off the passage, by which all the sick pass to the privy, and it has three open arches looking into the passage.

5th.—That the female wards are too open and exposed to currents, unless folding doors are placed in the arches.

6th.—That the proposed privy and bath-room accommodation for the men is insufficient.

To correct these faults, I beg to propose that a Committee of Officers be called similar to that which recently assembled to consider the proposed improvements to the General Hospital at Madras, and to be guided by the instructions furnished to them, and their proceedings to receive the approval of the Director General before they are carried out. Amongst other things a day-room for convalescents in the upper-story is essential, as is also a conveniently situated apartment in the main building, fitted with ventilation from without, and a closed spring-door

SERIES VI. SECTION VIII.

within, into which bed pans can be placed for the convenience of those patients who are unable to proceed to the general privy, and whose excretions it is necessary to examine. I would also urge the introduction of Duff's cooking apparatus into the hospital kitchen of H. M.'s 74th Regiment.

Seven men died from cholera during the past year in H. M.'s 74th Highlanders. The disease was confined to a Company, when *en-route* from Sholapoor to Bellary in January last, which marched past the encampment of the 35th Regiment Native Infantry (suffering severely at the time from cholera) about 100 yards distant, having made a forced march in order to avoid the cholera camp. Ten men were seized with the disease on the second and third day after their arrival in cantonment. Until recently syphilis has been the prevailing disease; between the months of March and September nearly two-thirds of the sick were venereal cases.

3rd Regiment Lt. Cavalry.

The Left Wing only of this Regiment is stationed here; when united the effective strength is 431 men; Public followers, 533; total 964. There are thirteen in hospital from local affections. The hospital is placed in the centre of the Regimental bazar, close to the men's lines and to the horse lines. The situation is bad, and the building itself has been universally condemned for years past by Medical Officers who have had charge of Cavalry Regiments stationed here. It is low-roofed and wanting in ventilation. There is no special ward for contagious diseases; the Surgery is too small, and the verandah is so narrow that the sun and rain beat into the inner ward. A separate ward, which is well raised and ventilated, has recently been erected for the accommodation of the followers of the Regiment. If it be determined to retain the Cavalry in the present position, and to improve the present hospital, the cheapest and most effectual way would be to enlarge the latter building to double its present extent, by raising the roof of the old ward, and uniting it to the new one; there would then remain ample accommodation in the old hospital both for the followers, and for a dispensary.

30th Regiment N. I.

The native barracks or place of arms adjoin those of the Cavalry about a mile south-west of the fort; the men's lines occupy a sloping position half a mile further west. The sick of the two Regiments of Native Infantry, which form part of the garrison, occupy one building contiguous to the place of arms. This building contains two wards, each capable of accommodating twenty beds. There is sufficient elevation and ventilation secured; but it is very much wanting in conveniences of every sort.

SERIES VI. SECTION VIII.

There is no store-room or bath-room. Bathing tubs, screens and other stores not in use are piled up in the front verandah (the only one the building possesses), or in the wards, and the Surgeries are so small, that a part of this verandah has also to be used as an office. A five feet wall surrounds the building; to the front it is distant about sixty feet, but to the sides and rear it is only six feet from the hospital. The side and rear wall ought to come down, and a dwarf wall, with rail above, should be carried all round sixty feet from the building. A verandah should be erected on the north-east exposure of the hospital, in which dispensary and bath-room might be constructed, and a privy placed at each gable of the building for the convenience of the occupants of each ward, instead of as at present having one in front for both, the effluvia from which is at times very offensive in the wards. The present privies could be turned into store-rooms, and the present dispensary into a ward for special cases.

The prevailing diseases in this Regiment are slight fevers, syphilis, and its concomitant rheumatic results. During the year there has been an average daily sick list of twenty; the numerical strength being about 1,000.

35th Regiment N. I.

The numerical strength of this Regiment is 976, and the number of sick in hospital is fifteen. When on the march from Hurryhur, and four days after the Regiment had left the station, cholera broke out amongst them. A few sporadic cases had occurred in the 16th, the relieving Regiment, prior to entering Hurryhur; but the Regiment marched into the station apparently healthy. On the 5th morning, after leaving Hurryhur *en-route* to Bellary, the disease broke out with much severity. On finding that an increasing number were being daily struck down, on the recommendation of the Surgeon, the Corps, on the 19th January, was broken up into three divisions, each party proceeding by separate routes to different encamping grounds. Immediate marked benefit was the result of this step. Under instructions from the General Commanding the Division, the Regiment was again re-united on the 22nd January. The cholera instantly increased three-fold, the type of the disease being also more severe than hitherto; when, on Surgeon Hadwen's urgent recommendation, the Regiment was again broken up on the 27th January, the disease at once began to decline, and the last two cases were admitted into hospital on the 4th and 5th February; but the Corps did not re-unite until the 14th February, the day they entered the cantonment. Each division

SERIES VI. Section VIII.

marched five or six miles daily, and the hospital tents were removed regularly twice a day to a fresh spot of ground. Independent of the cholera, diarrhœa prevailed largely. The treatment adopted was acetate of lead without stimulants, and this was found effectual to check early diarrhœa. Ninety-two fighting men were taken ill with cholera, fifty of whom died; 129 followers were seized with the disease, and fifty-eight died. Altogether the deaths to admissions were 47·36 per cent. omitting cholera. The ratios for the year are, admissions to strength 54·09 ; deaths to strength 0·82 ; deaths to sick 1·51.

SERIES No. 7.

NAGPORE, JAULNAH, AND HYDERABAD.

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NAGPORE.

That part of Central India denominated the Berar Division, or the old province of the Deccan, is now sub-divided; part forming the dominions of the Nizam, part the Nagpore territory, and part forming a portion of the Bombay Presidency. It is situated between latitude 20° and 21° north, longitude 76° and 79° east.

SERIES VII.
Topography.

The province of Nagpore is somewhat triangular in form; it extends between latitude 18° and 23° north, and longitude 78° and 83° east, the base being towards the Saugor and Dinapore Divisions on the north, and the sides towards the Hyderabad territories, and the northern country of Orissa on the south-east and west. Its estimated area is 26,700 square miles, and its population about 4,000,000. Its northern part is a high table-land, from whence the surface slopes southward to the plain, watered by the Payne Gunga, the Wyne Gunga, the Wurda and Godavery, and the Maha Nuddy rivers. The two former join the Wurda, which latter unites with the Godavery at Serlonnchah. The Godavery rises by numerous rivulets from the western ghauts, and after a tortuous south-east course estimated at 700 miles divides into two principal branches and enters the Bay of Bengal, in latitude 16° 30′ north, and longitude 82° east. During the rainy season it is in many places upwards of one mile in breadth.

The general surface of the country is irregular and mountainous; but there are many extensive highly cultivated plains, on which luxuriant crops of wheat, cotton, sugar, &c., are raised. Although much land has been brought under culture since the British got possession of the country, there are still extensive tracts of hill and forest unexplored. The revenue is small, as a large extent of territory belongs to Zemindars who only pay a quit rent to Government. The nature of the soil throughout the country is the black cotton, and a considerable quantity of kunker or calcareous nodules.

SERIES VII.

Roads.

The roads are very indifferent, in fact mere tracks. The country is almost impassable during the rains from this cause. There are four principal roads from the coast, one by Chandah along the Godavery leading to Ellore, which is only passable in the cold season; that by Ryepore towards Berhampore; and that to Hyderabad, the most direct, by Nirmul; the other by Hingolee. The Nirmul route was for a long period considered safe only from 1st June to 1st January; but parties now travel on it with impunity at every season, avoiding passing the nights in dangerous localities in the proximity of thick jungle. The road by Hingolee is open throughout the year. The safest and most direct route, however, is viâ Mirzapoor, and from thence down the Ganges, or by rail to Calcutta. The city of Nagpore, which is the capital of the province, is 722 miles from Madras, 733 from Calcutta, 577 from Bombay, and 324 from Secunderabad.

City of Nagpore.

In former days the Military force considered requisite to hold this country in subjection was located at the city of Nagpore, but in consequence of a scarcity of water it was transferred to Kamptee and placed on the banks of a river removed ten miles from the city. An Irregular force of all arms is now cantoned near the city, and the Commissioner and his Staff reside there. These are all under the Bengal Government.

Hill Fort of Seetabuldee.

The fort of Setabuldee is close to the city. It is garrisoned by troops from the British force at Kamptee, and commands the country on every side. On the occasion of my inspection the Garrison consisted of 40 Foot Artillery and Details, 350 Native troops, and 200 men of the Ordnance Department; besides several Warrant Officers connected with the Nagpore Arsenal, which is placed there. The average European sick was three to four, and that of the Natives six; the prevailing diseases being fever; cases of slight sickness are treated at the fort, all others are sent to the hospital at Kamptee. A Commissioned Medical Officer is usually in charge of the detachment. Two distinct supplies of medicines and books are kept here, and two separate indents for medicines are necessary, one for the Ordnance Department, and another for the Field force. This practice might with advantage be discontinued. The Civil Surgeon at this station receives all his supply of medicines direct from Calcutta, on indent countersigned by the Superintending Surgeon of the Division; this too appeared to me unnecessary, when there are large Medical Stores at Kamptee capable of meeting all his wants.

SECTION I.

Kamptee.

The head-quarters of the Nagpore force is situated at Kamptee in latitude 21° 10' north, and longitude 79° 50' east, and is ten miles east of the city of Nagpore. It stands at an elevation of 939 feet above the sea, and stretches four miles along the southern bank of the Kanan river. The site has been selected without regard to the most ordinary sanitary considerations. It runs along the bank of a broad river, the channel of which is exposed the greater part of the year. The ground is intersected with ravines, which during the rains carry down a large quantity of surface filth, and swamp the cantonment and its neighbourhood. Thus the physical conditions requisite for the production of malaria are present while any moisture remains on the surface, and when the streams dry up, the channels become receptacles for filth of every sort. When I visited this station it was in contemplation to extend the cantonment along the bank, and secure ground for the erection of European Dragoon barracks there. To do this would but perpetuate the evil originally made. SERIES VII. Section I.

The ridge to the north-west of the cantonment, and the slope in the direction of the river from this ridge, are free from the objections above detailed, and on sanitary grounds are decidedly the best position for the erection of barracks, and extension of the military cantonment. The elevation at any portion of this ridge ensures a pure atmosphere, free ventilation, and perfect drainage, while a plentiful supply of water may be secured from wells or by storing the streams descending to the river. His Excellency Sir Patrick Grant, the Commander-in-Chief, in whose company I visited this cantonment, was pleased to concur in the above views. Cantonment.

The Artillery and European Infantry lines occupy the most western portion of the cantonment. the three native lines are in the centre, and the lines of the Cavalry are on the east extreme. The Sudder bazaar is situated in the vicinity of the Cavalry, and a small bazaar occupies the space between the European Infantry barracks and the river. The country in the immediate vicinity of the station is broken, intersected by ravines, and during the rains much of it becomes swampy. From the river the ground rises gradually towards the west to a range of low hills distant about fifteen miles. The banks of the Kanan are generally precipitous, and the breadth of the stream opposite the cantonment is about 300 yards.

SERIES VII. Section I. Seasons.

The seasons at Nagpore are three; the cold, the hot, and the rainy. The transitions are usually very regular. The cold continues from the middle of October till the middle of March, the hot from March to June, and the rains from June to October. The diurnal range of temperature necessitates great attention to be paid to precautionary measures, such as appropriate clothing, &c. The mean temperature during the cold months is 68°, the lowest known has been 36,° and the highest 110°. In the hot season the temperature, in a house well protected, ranges from 96° to 104°, but outside it has been observed to rise to 140°. The average fall of rain per annum is forty inches, and during the rainy season the thermometer ranges from 76° to 86°.

Horticulture.

Gardening is practised with much success during two-thirds of the year. Every description of European vegetable comes to perfection during the cold season, as well as flowering plants and shrubs of extra-tropical regions. The roads are well shaded; but vegetation is too excessive, and the underwood requires to be removed. The heavy night dews in the cold season are highly beneficial for agricultural purposes, and the whole face of the country looks like a garden.

Salubrity.

Kamptee has long been notorious for fever of a severe form, and also apoplectic seizures among the European soldiers. An opinion at one period prevailed that the sole causes of fever were the deleterious principle of malaria evolved from a dense tract of jungle country distant about twenty miles north of the station. The opinion is not now entertained. As I have already shown, abundant cause for the production of the malady exists at the station in the filth which accumulates in and around the cantonment, in the numerous receptacles for it, in the swampy nature of the ground, and in the exposed bed of the river. Dr. Kennedy, the Officer in charge of the Artillery, remarks on this subject: "During the rains the surface soil around is constantly subjected "to the process requisite for producing the marsh poison, viz., alternating, "flooding and drying, the whole physical conditions presented, being "analogous to those described by Dr. Fergusson in Spain, as having "occasioned fever of the most serious nature." The constant recurrence of fever at this station is, I am satisfied, due far more to local causes than to those proceeding from a distant source. To correct these, the cantonment should be gradually withdrawn from the bank of the river, a more perfect system of drainage should be introduced, and all redundant vegetation and refuse of the dwellings and streets should be carefully removed.

The troops, as per margin, had only arrived at Kamptee a few days prior to my reaching the station. Their strength is 500, and their sick list present only trifling cases. The Corps had only been a month in India, and the Left Wing remained at Jaulnah when *en-route* to Kamptee. The barracks are sadly deficient in ventilation and in protection from the direct rays of the sun. I quite concur in the views of the Surgeon in charge, who states "that the cases of insolation which have been "brought to hospital from the barracks were induced by the confined "and suppressed nature of the atmosphere, the high temperature not "only from the direct rays of the sun on the building, but also the "heat reflected from the walls which surround it." His Excellency the Commander-in-Chief and the Commissioner of Nagpore concurring also in these views, applied to Government for the immediate introduction of ventilation into the buildings, recommending also to raise the roofs and to protect the side walls from the direct rays of the sun by verandahs, to remove the very objectionable prison-like wall, which during the day gives off reflected, and during the night retained, heat, and which obstructs the free circulation of air, and substitute in its stead a wall two feet high with a railing above.

SERIES VII. Section. Head Qrs. and Right Wing H. M.'s 91st Regiment.

The position occupied by the married men of the European portion of the force is most objectionable in a sanitary point of view. The ground is low and efficient drainage is impossible. In the rains it becomes swampy and flooded with the filth washed down from the high grounds around. The quarters are built close to the wall which surrounds the barracks; the privies and cook-rooms being erected in the narrow space between. His Excellency the Commander-in Chief having examined the above with much care, was constrained to condemn the locality in *toto*; another site being selected, which, if space can only be commanded by the removal of private buildings, is admirably adapted for married men's quarters. A main covered conduit to the bed of the river with communicating covered branch drains from the privies and wash-houses, and ridge ventilation to all the buildings, would secure purity of atmosphere and perfect cleanliness.

In consequence of the urgent demand for troops in advance to aid in quelling the mutiny in Bengal, the garrison of Kamptee has been in a state of transition during the past twelve months. Amongst the European portion of the garrison, remittent fever preponderates over all other complaints. In the majority of cases, the paroxysms were characterised by well marked stages, but many assumed from first the distinct remittent form, with

D Troop Horse Artillery. Head Quarters 2nd Battalion.

SERIES VII. SECTION I.

cerebral or gastric complications. In former days (I speak of twenty years back) "the most successful plan of treatment was early vascular depletion, "general and local, or both; and next to depletion, full doses of calomel "and opium; calomel grs. xx, opium grs. ii, given at night, followed by a "purgative in the morning. Besides the night dose of calomel and opium, "the same medicines in smaller doses were given at intervals during the "day, relieving symptoms of irritation by timely local depletion." The anodyne and diaphoretic effects of the calomel and opium "were tranquil-"lizing through the night and prepared the bowels to be favorably acted on "by the aperient, which, if the stomach would bear it, was the common "purging mixture of senna and salts."* The result of this treatment, which was extended to other diseases as well as to fevers, was a heavy death-rate, far exceeding that now observed.

The Director General will doubtless have observed that the system of treatment pursued by the present able Surgeon in charge of the Artillery, is diametrically opposite to that practised at the period quoted. Under him as well as under his immediate predecessors, vitiated secretions are corrected, febrile action is repressed by moderate local bleedings, and other means, without resorting to general depletion; recurring accessions are prevented by the free administration of quinine, at an early stage of the malady, and a light generous diet is allowed. Dr. Kennedy observes, "that although the aggregate number of fever cases is smaller than "that of former days, there has nevertheless been an increase of admis-"sions of the remittent form, which indicates that the cause, whatever it "may be, is equally as intense now as in former years. Cerebral conges-"tion is the local determination most frequently observed; but the liver, "spleen, and stomach are also often implicated, and in more than one "case a typhoid character supervened." After detailing his treatment, Dr. Kennedy further observes, "that the depleting system of treatment "pursued in former years, occasioned an increased liability to malarious "influence amongst those who recovered from fever. The health of the "D Troop Horse Artillery, who have been eight years at the station and "have suffered severely from fever during the early part of that period, "has during the past two years very much improved; the admissions from "fever have diminished, and recoveries are more rapid."

The number of deaths from apoplexy in former years was enormous. For ten years prior to 1838 they amounted to nearly 73¾ per cent. of the sick treated now, the great majority of the cases which in former

* Surgeons Adams and Stevenson's report 1837.

days were returned as apoplectic seizures are treated as cases of "insolation," where to bleed is to produce certain death. But in order to contrast the death-rate amongst the European portion of the force during the last ten years, as compared with that which obtained twenty years ago, I append the following table :—

From 1829 to 1838.		From 1849 to 1859.	
Aggregate strength	9,574	Aggregate strength......	3,216
Do. admissions......	23,093	Do. admissions...	6,212
Do. of deaths... ...	377	Do. of deaths......	72
Average per centage of deaths to treated.......	1·632	Average per centage of deaths to treated.......	1·159

which of itself is an encouraging assurance of the vast advantages of the present mode of treatment of diseases, as compared with that which formerly obtained.

Head Quarters 26th Regiment N. I.

The medical charge of this Regiment was, at the period of my inspection, temporarily held by a subordinate. The strength of the Corps at Head Quarters hardly exceeded 300 men, and there was no sickness amongst them. The hospital of the Regiment is a poor ill-ventilated narrow building, badly placed, in too close proximity to the native lines of the Regiment. The prevailing diseases are fever, rheumatism and syphilis.

32nd Regiment N. I.

A large body of this Corps is also on service. At Head Quarters there are only five sick on the list. The hospital for the sick is a spacious well-ventilated building in two parallel wards, having a separate roof to each.

33rd Regiment N. I.

The sick list in this Regiment numbered thirty-two at the period of my inspection. The average daily sick for the year prior to my visit was twenty-one; fever being the prevailing disease.

Detail and Depot Hospital.

In this hospital the families of all parties proceeding on service and the sick of the Sebundy Corps are treated. The number in hospital necessarily varies; detachments are constantly passing through the station either to or from the force in advance. Several cases of gun-shot wounds are under treatment, but the majority of admissions are from fever. In consequence of the number of sick requiring accommodation, a large building similar to that occupied by the 32nd Regiment has been temporarily handed over for their accommodation. There were fifty under treatment at the period of my visit.

Dispensary and Jail.

The average number of daily sick receiving relief at the dispensary is twenty, the sick in hospital being sixteen; they are chiefly from the bazar in which, it is computed, there are between 20,000 and 30,000

SERIES VII. SECTION I.

inhabitants. Fever is the prevailing disease; syphilitic disorders form also a large proportion of the admissions. In the jail there are— prisoners, of whom five are under treatment. The space allotted to them is limited, and the ventilation is very deficient.

Medical Store Department.

The quantity of Medical Stores kept at this station has very much increased during the past two years, in order that the demands of the force in advance may meet ready supply. The building set apart for the Stores does not admit of any proper classification being made, which has been a very great inconvenience to the Officer in charge. A temporary building has been rented by Government for the purpose, which will be retained, if necessary, until suitable accommodation is erected. His Excellency the Commander-in-Chief selected an appropriate site for this purpose, and the building is to be proceeded with at once.

SECTION II.

JAULNAH.

SECTION II. Left Wing H. M.'s 91st Regiment. Detachment 18th Royal Irish and Royal Artillery.

The details as per margin comprised the force at Jaulnah at the period of my visit. The wing of the 91st Regiment had only just arrived, and the others were convalescents left behind by Corps passing through. His Excellency the Commander-in-Chief contemplates stationing a large force at Jaulnah; ground was selected for the purpose while we were there. The following is the copy of my report on the locality. "I have carefully "examined the position fixed on by His Excellency the Commander-in-Chief "for European barracks at this station and consider it a most eligible one. "It has a considerable elevation over the town of natives and present "cantonment; slopes gently on both sides towards ravines, into which the "drainage could be conveniently carried from the barracks to a considera- "ble distance. To the north-west of the site, is a still more elevated ridge "of hard red earth, admirably adapted as a position for the hospital."

SECTION III.

HYDERABAD.

SECTION III. Topography.

The dominions of the Nizam of the Deccan occupy nearly the centre of the Peninsula of India, between latitude 15° and 21° north, and longitude 75° and 82° east. It has the Nagpore country on the east, Mirwar and Candeish on the north, on the south it is bounded by the Ceded Districts

and Guntoor, and on the west lie the Bombay territories. The Wurda and Godavery rivers mark its natural boundaries on the east. The Tumbudra and Kistna very nearly denote its southern and northern limits, all the streams having more or less an eastward course. The area of the country is estimated at 90,000 square miles, its average breadth is two hundred and seventy, and its length three hundred and twenty miles, and the population of the country falls little short of 10,000,000. The general surface of the country is regular and undulating. The most elevated portion of the plateau is Beeder, being about 2,000 feet above sea level. On the Lackenwarra and Adjunta range of hills to the north-east, there is some table-land reaching an elevation of 2,700, and on the Vendya or Gwalyhur range, still further north, the altitude reaches 3,600 feet. These hills are referred to in a separate report.

The soil is either siliceous, or a rich black vegetable loam in the plains and hollows, but on the high grounds there is much decayed trap. It is extremely fertile everywhere; and when capable of being irrigated in situations where alluvial deposits are collected, rich crops are produced. The country altogether is well cultivated. Cotton, jowaree, wheat and oil seeds grow with the greatest luxuriance; extensive topes of date and palmyra trees are found everywhere; but the country in general is thinly wooded, and there is no extent of forest trees in any of the jungles.

The seasons return with great regularity, and may be classed into the cold, from the middle of November to the middle of February; the hot, from the latter period till the end of May; and the rains, from early part of June till the end of September. In the months of April and May, the winds are hot, and the thermometer exposed to them rises to 110°. The heat varies after night-fall, and towards morning it becomes pleasantly cool. The mean temperature in the house for a series of years taken by myself at sun-rise, 2 P. M., and sun-set, at almost every station in the Deccan, was as follows:—

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
72	76	84	91	93	88	81	80	79	79	75	72

The average annual fall of rain is thirty-two inches.

The climate of the Deccan, upon the whole, is considered to be one of the most pleasant and salubrious in India. During the greater part

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of the year the mornings are fresh, invigorating and cool; the Anglo Indian enjoys here a delightful medium between the extremes of heat and cold experienced in the upper provinces of Hindoostan. The hot season is decidedly the most healthy period of the year; during the rains the exhalations from the soil engender fever, and during the months which comprise the cold season, the variation of temperature is great and sudden; the mornings are bitterly cold; the thermometer from being close on freezing point during the night, ascends above 80° in the course of the day, and the winds are northerly or easterly. It is at this period that extreme caution is so necessary in order to protect the surface from sudden chills by night or by day, and unless the European pays attention to this, visceral or hepatic derangements are most inevitable: convalescence from severe attacks of this nature, being invariably slow and imperfect without a change, especially to the sea coast.

Horticulture is carried to great perfection by the European Officers at all the Military stations within the dominions of His Highness. All European vegetables are raised in great perfection. Strawberries, figs, grapes, peaches, and almost every extra tropical fruit are in size equal to anything met with in England, although somewhat deficient in flavor. The province is supplied with large reservoirs of water or artificial lakes formed by embankments thrown up between ranges of hills or elevated ground.

The roads to the coast from the city of Hyderabad are four—first that viâ Wanapilly and Ongole 399 miles; second, that by Bezwarra to Masulipatam 221 miles; third, that viâ Kurnool and Cuddapah or Bangalore about 400 miles; and fourth, that to Bombay by Sholapore distance exceeding 400 miles. To those proceeding to England the last is decidedly the most convenient and expeditious, as a regular transit is now laid to Sholapore, from whence the Railway proceeds to Bombay.

City of Hyderabad.

The city of Hyderabad.

The city of Hyderabad, the capital of the Nizam's dominions, is 1,672 feet above the level of the sea. The other chief towns in the province are Aurungabad, Jaulnah, Mominabad, Hingolee and Ellichpoor. Independent of the regular Subsidiary forces which the British Government are by treaty bound to keep within the province, His Highness retains at his own cost, a Contingent Corps of all arms officered from the line, a most efficient body of men, occupying position contiguous to the chief cities in his territories; but as these are under the direct orders of the Go-

vernor-General they did not come under my inspection. Hyderabad is a fortified city erected on the Mussay river, a tributary of the Kistna, latitude 17° 20' north, and longitude 78 ° 83' east. Its population comprising Rohillas, Arabs, Affghans, Pattans, &c. is estimated at 200,000. It is the stronghold of Mahomedanism in the Deccan. The city is about four miles in length and three in breadth, it is enclosed by a stone-wall, and has narrow, crooked, ill-paved, dirty streets and poor houses, chiefly built of wood. It may be said to be a focus for diseas at all seasons; Cholera is never absent from it.

SECUNDERABAD.

Cantonment of Secunderabad.

The Head Quarters of the Hyderabad Subsidiary force is 1,800 feet above sea level, it lies six miles to the south of the city, and five miles to the north-east of the cantonment is Bolarum the Head Quarters of the contingent above adverted to, the elevation of which is greater than that of Secunderabad by 100 feet. The cantonment extends in a direct line east and west, it is upwards of four miles in length from the old European Infantry Barracks or east end to the termination of the Native Cavalry lines at the Bowenpilly or west end of the line; left of the European lines follow two of the Nativo Infantry Regiments; to the right is a third; further on to the right, on dry and elevated ground, are the Barracks for the Artillery; beyond this the lines of another Native Infantry Regiment; and to the extreme north-west there are quarters for the Horse Artillery, another Regiment of Native Infantry, and the Native Cavalry.

Hoossain Saugor tank.

South of the Horse Artillery lines and lying between the Cantonment of Secunderabad and the city of Hyderabad is the extensive Hoossain Saugor tank, which is several miles in circumference, and irrigates a great extent of land in immediate proximity to some of the Native Infantry lines and bazaars. There is a perpetual flow of water from this tank, what is not absorbed in irrigating purposes, passes away by the natural drainage of the country in the direction of the east, receiving in its course the sewage from the more elevated ground, on which the lines, Barracks, &c., are placed, and passing by open drains not far from the old European Infantry Barracks, pollutes the atmosphere in its progress, and finally becomes disembogued in the river a mile below.

Old European Barracks.

For many years past a violent epidemic made its appearance almost annually amongst the soldiers, who occupied the old European Infantry lines. The Director General has recorded in his Office the views of many able men who have brought forward sound reasons to prove that

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the constructions of the Barracks are faulty, and the site in every way objectionable; amongst these is the report of a Committee of eminent Medical Officers who inquired into the subject in 1853, and on which Government resolved to abandon the old Barracks and erect others in a more salubrious locality. These latter are now occupied, and they form perhaps the most commodious and handsome of public works of this description in all India. I subjoin an account of them drawn up by Major Henderson, the Engineer in charge.

New European Barracks.

For the construction of the new European Infantry Barracks, a piece of ground enclosing about two and a half square miles was given over to the British Government by His Highness the Nizam and added to the Cantonment of Secunderabad. The foundation stone was laid in November 30th, 1854, by G. A. Bushby, Esq., the Resident at Hyderabad, in presence of the European troops at the station, and the work was immediately put in progress. A general idea of the extent of the buildings may be formed when it is stated that their walls enclose nearly six millions cubic feet of air, in addition to which, the whole of the Barracks and principal buildings, have outer-colonaded verandahs 11½ feet in width and 13 feet in average height. The whole of the buildings taken together, actually stand upon 14¼ acres of ground, but taking into consideration their relative distances from each other, the highest pieces of ground having been selected for their sites, the total area that they occupy amounts to 220¼ acres, or more than one-third of a square mile.

The Barrack ranges for the single men are ten in number, each range containing for their accommodation 2,46,000 cubic feet nearly. Taking the total amount of rank and file of an European Regiment to consist of 800 Privates, 50 Corporals, 20 Drummers and 20 Half-pay Drummers, total 890, and from this deducting 120, the number of married men, we shall find 770÷10 or 77 men to be the number contained in a complete Company of rank and file to be lodged in one Barrack inclusive of men on duty, command, sick and prisoners. The cubic content of each Barrack range is 2,45,984 cubic feet, consequently deducting 43,520 cubic feet for the Serjeants' quarters, the quantity of air supplied for each man would be 2,730 cubic feet nearly; but if allowance be made for the contingencies referred to above, we shall find that 4,000 cubic feet is nearer the actual amount, and it is to be taken into consideration that this air is continually undergoing purification, as either the doors or ventilators of the barracks are always open in this climate.

At the extremities of each barrack range and at angles to the general length, are wings containing quarters for four Non-commissioned Officers, who would each have two rooms and be supplied with 10,880 cubic feet of air. Situated on a gentle slope, at a little more than 150 yards to the north of the principal buildings are ten ranges of Barracks for married men, covering with roads and gardens 3,69,415 square feet or nearly 8½ acres. The number of these ranges corresponds with those for single men, so that each Company will have separate accommodation for its single and married soldiers; each range is constructed to hold Non-commissioned Officers and twelve married rank and file: the quarters of the former consist of four rooms enclosing 11,284 cubic feet, and the latter two rooms, enclosing 5,872 cubic feet of air; in rear of each quarter is a court-yard containing three out-houses, viz., cook-room, bath-room and privy.

The hospital which is a very superior building of two stories, an improvement upon the Fever Hospital at Calcutta, is constructed to accommodate 140 patients exclusive of women, affording to each man 2,673 cubic feet of air, and this independent of Apothecary's rooms, store-rooms, Nurse's rooms, ward for severe cases, female ward, bath-rooms, clothes rooms, and Dispensary. The building is replete with every accommodation, and no expense has been spared by Government in providing for the cure and comfort of their sick European Soldiers.

The cost of these Barracks was about 13½ lacs of Rupees or equal to £ 1,35,000, nearly the whole of the buildings are provided with flat terraced roofs and finished with double outer-doors and windows throughout, viz., one glazed and one venetianed.

Now, assuming five per cent. as the rate of interest, at which money could be borrowed at the time of the construction of these buildings, this sum would yield £6,750 per annum, or £18-9-10½ per diem. Thus, taking the aggregate cost of all the buildings into consideration, and supposing a complete Regiment to contain 947 men including Serjeants, it would appear that the amount paid by Government, for lodging each man for a day of twenty-four hours is not quite 4¾ pence, and this includes every possible requirement for health, cleanliness and recreation. Taking the cost of the Barracks and family quarters alone, and following the same process as above, a result would be obtained, showing that each single man is lodged at an expense of only 1¾*d.*, and each married man with his wife at 3*d.* for a day of twenty-four hours, and this is exclusive of children. In short, it is firmly believed, that a single night's

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shelter at any of the lowest London lodging houses, could not be obtained for the sum at which a whole family are accommodated in the new Barracks with the greatest comfort.

Hitherto the calculations have been made for a Company's European Regiment, as at present constituted; but it must be borne in mind that the buildings are capable of accommodating a far greater number of men than they are constructed for. For instance, the number of men abovementioned as composing a Regiment are supposed to be accommodated in the principal hall only, but one of the inner verandahs will alone contain thirty-two cots additional, whilst the auxiliary buildings including the hospital, are equally capable of affording the extra accommodation required to meet this surplus. In fact, the Barracks would with ease contain two Regiments on emergency, not however, including women and children; but as the families would not be allowed to accompany the men on active service, the above statement suffers no deterioration. On the supposition, however, of the number of men contained in one Barracks, amounting to 104, for whom, including Serjeants, there is ample accommodation, the cost per diem of each man (taking the whole of the buildings into calculation) would be but 3½*d*. for a day of twenty-four hours, and if the calculation be restricted to that of mere lodging, or of one of the Barrack ranges only, the cost would be 1½*d*. for each man.

Abundance of water is procurable on the spot from wells now in course of construction, and the superior salubrity of the situation has already been tested by sending the convalescent men from the old barracks for change of air, which in most cases was attended with complete success.

In consequence of the influx of Europeans to aid in quelling the mutiny of the Native Army in Bengal, it became necessary to continue the occupation of the old European Infantry Barracks. During my recent tour in company with His Excellency the Commander-in-Chief, this subject was forcibly brought to notice in consequence of the terrible mortality which had almost decimated the soldiers of the 1st Royal Regiment of Foot during the twelve months prior to our arrival there. His Excellency personally devoted much attention not only to the subject of the old European Infantry Barracks, but also to the position of the cantonment generally, which has gradually grown into such enormous proportions, that it is said to cover an area of twenty miles, and that some

of the Corps have to perform a march of ten miles in proceeding to, or returning from, an ordinary Brigade field day. His Excellency, I believe, came to the conclusion that the present straggling position of the cantonment,is utterly indefensible in a military point of view; and sanitarily considered, as compared with other available positions around, it is about the worst that could have been selected. His Excellency having called on me to submit my views on this subject, the report of which, the following is a copy was handed to him at Secunderabad, under date 4th January 1859.

Special Report to the Commander-in-Chief on Secunderabad.

1. A residence of fourteen years in the vicinity of this station and a knowledge of almost every Regiment which has visited it in that period, enables me to speak with some confidence on the hygiene of the cantonment.

2. The position occupied by the European Infantry barracks is lower than any other part of the cantonment. Elevated ground surrounds it on all sides; it thus becomes the focus of the drainage, a narrow substratum of soil over rock and a gradual slope tends to retain the moisture and interrupt drainage; the ground around is saturated with organic matter, and there are two extensive grave yards in close proximity.

3. The barracks consist of a square of narrow ill-ventilated, closely packed buildings, and a detached building for the flank companies. Close on one side of the square, in the direction of the prevailing winds, are extensive ranges of privies and cook-rooms, a high prison-like wall surrounds the barracks and the free circulation of air is retarded by blocks of buildings within this enclosure.

4. The effect of all this is, that the emanations from the earth, the fœtor from the privies, sewers and cook-rooms, and the vitiated atmosphere from the presence of so many men in a small space induces an unwholesome state of the atmosphere; thus tainting the blood and rendering the soldier susceptible to disease on every change of the weather, or other exciting cause.

5. These barracks have frequently been condemned as a residence for soldiers by Committees of Military and Medical men of high reputation; but the exigencies of the service rendering it necessary that they should still be occupied, large sums of money have been expended in improving them.

6. The terrible mortality which has almost decimated the soldiers of the 1st Royal Regiment of Foot during the past year, again forces the subject on our attention.

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7. In a report by the late Inspector General of Hospitals, Dr. Burke it is asserted, that during a period of thirty years, the cost to the State on account of loss of life amongst British soldiers at this station, estimating each soldier at £100, amounted to £ 1,50,000.

8. While the men in barracks suffer so dreadfully, the Officers of the Regiment and the other European inhabitants of the Cantonment are exempted from the same grave form of disease; the few cases which occur amongst them being of a much milder character.

9. The European Artillery stationed at the distance of a mile and a half from the barracks are also quite healthy, nothing can be more objectionable, sanitarily considered than the construction of their barracks and hospitals. These are even worse than the buildings occupied by the European Infantry, but being placed on a high and healthy locality, the maladies which afflict the men usually yield to treatment.

10. That this exemption is not an occasional or accidental one, is shown by the subjoined table exhibiting in contrast the sanitary state of the Corps occupying the European Artillery and Infantry barracks from the year 1837, to the present date.

Years.	European Artillery.					European Infantry.				
	Average strength.	Average sick to strength.	Total admissions each year.	Total deaths each year	Proportion of deaths to strength.	Average strength.	Average sick to strength.	Total admissions each year.	Total deaths each year.	Proportion of deaths to strength.
1837	$120\frac{8}{12}$	$9\frac{1}{3}$	258	5	$4\frac{1}{8}$	851	$9\frac{1}{3}$	1,463	125	$14\frac{1}{10}$
1838	$96\frac{10}{12}$	8	204	5	$5\frac{1}{4}$	$728\frac{1}{2}$	$9\frac{1}{3}$	1,316	52	$7\frac{1}{8}$
1839	$96\frac{6}{12}$	$5\frac{3}{4}$	162	6	$5\frac{3}{4}$	$630\frac{1}{4}$	$9\frac{1}{4}$	1,172	37	$5\frac{7}{8}$
1840	$104\frac{8}{12}$	$6\frac{1}{4}$	169	0	0	$604\frac{5}{12}$	9	1,256	32	$5\frac{1}{4}$
1841	$115\frac{9}{12}$	4	153	4	$3\frac{1}{2}$	$855\frac{9}{12}$	$7\frac{3}{4}$	1,859	33	$3\frac{7}{8}$
1842	$104\frac{4}{12}$	$3\frac{13}{16}$	116	2	$1\frac{7}{8}$	$945\frac{1}{2}$	$7\frac{1}{4}$	1,773	49	$5\frac{1}{8}$
1843	101	2	77	0	0	824	$9\frac{2}{3}$	1,608	90	$9\frac{1}{6}$
1844	93	$4\frac{1}{3}$	108	6	$6\frac{1}{2}$	904	$7\frac{3}{4}$	1,526	58	$6\frac{1}{2}$
1845	80	$3\frac{1}{8}$	75	0	0	1,008	$5\frac{1}{2}$	1,445	30	$2\frac{9}{10}$
1846	159	$7\frac{1}{8}$	128	6	$3\frac{3}{4}$	924	$8\frac{2}{3}$	1,790	62	$6\frac{2}{3}$
1847	146	$7\frac{1}{2}$	212	6	$4\frac{1}{9}$	1,052	$7\frac{1}{3}$	1,749	37	$3\frac{3}{5}$
1848	158	$6\frac{3}{5}$	253	2	$3\frac{1}{4}$	1,099	$6\frac{9}{11}$	1,633	29	$2\frac{4}{5}$
1849	179	$6\frac{1}{2}$	264	4	$2\frac{1}{4}$	431	$5\frac{1}{6}$	85	0	0
1850	170	$5\frac{1}{3}$	252	8	$4\frac{1}{5}$	980	6	1,663	22	$2\frac{1}{4}$
1851	176	4	188	1	$\frac{1}{2}$	988	$7\frac{2}{3}$	1,958	62	$6\frac{1}{4}$
1852	186	$5\frac{1}{2}$	248	5	$2\frac{2}{3}$	964	7	1,781	5	$\frac{1}{2}$
1853	150	$5\frac{1}{3}$	206	0	0	905	$7\frac{1}{3}$	1,580	12	$1\frac{1}{3}$
1854	84	6	128	2	$1\frac{1}{3}$	637	7	1,659	36	$5\frac{2}{5}$
1855	$115\frac{3}{4}$	$6\frac{1}{11}$	196	4	$3\frac{1}{2}$	852	$10\frac{1}{4}$	1,961	18	$2\frac{1}{6}$
1856	175	8	311	5	$2\frac{6}{7}$	812	$5\frac{3}{4}$	1,302	10	$1\frac{1}{5}$
1857	134	$6\frac{3}{4}$	243	2	$1\frac{1}{2}$	1,067	$8\frac{1}{2}$	1,753	20	$1\frac{9}{10}$
1858	95	$6\frac{1}{3}$	140	3	$3\frac{1}{6}$	1,186	$\frac{3}{4}$	1,161	110	$10\frac{3}{5}$
Average.	$131\frac{1}{4}$	$5\frac{7}{11}$	186	$3\frac{6}{11}$	$2\frac{6}{11}$	$888\frac{2}{11}$	$7\frac{5}{11}$	$1,523\frac{5}{11}$	42	5

11. Thus it will be observed, that during a period of twenty-two years one Corps has lost an average of 2·80 per cent. the other 5 per cent. or about double, and the one has had 5·63 per cent. the other 7·27 per cent. constantly sick.

12. The diseases which usually occasion this destruction to life amongst the European Infantry soldiers, are acute dysentry and hepatitis, both being induced by a vitiated state of the blood. In some cases it runs its course in a few days, in others, a few hours after its first appearance the patient is in a hopeless state. Acute dysenteric symptoms usher in the disease, and it rapidly passes on to ulceration, sloughing, and at times gangrene of the large intestine, complicated generally with abscesses in the liver.

13. Dr. Innes, in his report of the King's own Regiment dated 30th September 1843, observes "the most anxious attention has failed to discover and if possible obviate the causes in which this frightful pestilence has originated, but only negative results were obtained. The men in the Patcherry and Barracks, those who performed night duty and those who did not; those who occupied barrack rooms exposed to the monsoon, or sheltered from it, those of temperate or intemperate habits, all suffered alike."

15. Although some seasons present a more favorable aspect than others yet, taken as a whole, I think I am justified in asserting that a more appalling proof of the unhealthiness of the position and structure of the present European Infantry barracks cannot be presented.

15. The lines of some of the native portion of the troops are also placed in low localities, as compared to the more elevated ground in the neighbourhood. The average number of sick in these exceeds what we usually find in Native corps elsewhere. The type of disease which afflicts them is fever and its concomitants, engendered, I believe, from local exciting causes, and although amenable to treatment and not fatal in its results, still relapses are frequent, they exhaust the patient and make him a burden on the State. The hospitals of two of the Regiments of Native Infantry are too far removed from their lines, and the space in all for the accommodation of the sick is on too limited a scale.

16. In the formation of the Military Cantonment of Secunderabad, therefore, I am compelled to admit that the importance of sanitary science as bearing on the health and general well-beings of troops, whether in the position or architectural structure of barracks and hospitals, has

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not been recognized. The advice of the Medical man may relieve the effect, but the removal of the cause must rest with the Military authorities.

17. The authorities which guided the selection of the site and planned the construction of the new barracks at Trimulgherry were impressed with the conviction of the importance of giving every consideration to questions which vitally concern the health and, therefore, the efficiency of the Army.

18. The altitude above the sea level of the most elevated portions of the present Cantonment, averages 1,800 feet. To judge from appearances, the positions occupied by the European Infantry barracks, the Native Infantry lines and bazaars are fully 100 feet under this level.

19. The height of the table-land on which the new Trimulgherry barracks are built averages 1,900 feet, and it gradually rises for a distance of five miles further north. The water-shed, or line separating the drainage of the Kistna and Godavery, passes about six or seven miles north of Trimulgherry, and is about 2,000 feet above the level of the sea.

20. The Cantonment should occupy this elevated plain; but if there be insurmountable Military considerations which render it necessary to delay the adoption of this proposition, I would earnestly urge, that hereafter, when it may become necessary to erect public buildings, either for the British or Native soldier, advantage be taken of the many available and favorable localities which are to be found in that direction.

21. The old European Infantry barracks have been unoccupied since the 9th of December last. The disease, which in the course of a few months carried off so many men, assuming a violent type, and affecting more or less the entire Regiment, it was deemed expedient to order the men into tents and march them into the country.

22. The Regiment have again encamped in the neighbourhood of Cantonment, the severity of their malady has abated and deaths are less frequent. The question now comes to be, how are they to be accommodated. I am of opinion that there is space for two-thirds of them in the new Trimulgherry barracks, and that the remaining third can be placed in the old flank Company barrack, which occupies a higher position than the others, and has been comparatively free from disease, and in the hospital which is also less unfavorably situated; the sick of the Regiment to be sent to the spacious hospital at Trimulgherry. I am further of opinion that if it is deemed necessary to re-occupy temporarily the remainder of the barracks in the old locality, that before this is done, the following improvements be forthwith instituted:—

1st.—That the two sides of the square, facing east and west, be entirely pulled down.

2nd.—That the surrounding prison-like wall be levelled.

3rd.—That the many buildings which impede the free circulation of air, and the ranges of privies be also pulled down; other privies to be constructed in suitable localities.

4th.—That the men occupy only the centre part of the building and on no consideration to be permitted to crowd the apartment by sleeping in the verandahs.

5th.—That if additional space be required, thatched mud barracks be erected as a temporary measure.

6th.—I would further submit that the men be encouraged to garden, and as much liberty as is consistent with discipline be given to them. With this view, as there are no trees or shade in the neighbourhood, I beg to suggest that pandals or sheds be erected, under which the soldiers could have shelter from the sun, and be thus induced to leave their barracks during the day.

A mixed Committee of Military and Medical Officers, of standing in the service, assembled by order of His Excellency for several days successively on the ground indicated above, and submitted a report on its extent and capabilities. They unanimously considered that this space is sufficiently ample for the transfer of all the troops scattered at present over so great a surface; that, as a Military post, it commanded all the country around; that a sufficient supply of water could be secured; and that in a sanitary point of view, with judicious arrangements, such as the planting of trees and proper drainage, the site was admirable. The ground is an elevated ridge about five miles in length and one in breadth, possessing facilities for drainage on both sides at a considerable distance from the position and from the proposed site.

Her Majesty's 1st Royals.

This Regiment, as already stated, was obliged to vacate their barracks and proceed towards the high land of Beder. For some months prior to leaving barracks, they suffered much from the usual epidemic of the locality, viz. dysentery, complicated with hepatic affections. During the year ending 31st December while located in these barracks, they had lost 114 men, and about the same number were likely to be permanently disqualified for service from the same cause. The men themselves attribute their disease to too much crowding and confinement to quarters, and to the fœtid emanations from the privies; in themselves, doubtless sound reasons, and, to these may be added, the other exciting causes already detailed.

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The sick had all been removed to the spacious hospital at Trimulgherry, and the health of the men improved as soon as they left the old barracks. The sick of the Regiment were sent in from Camp, and the type of the disease was daily becoming less intense. On the morning of my inspection there were eighty-nine sick in hospital, of whom thirty-four were suffering from dysentery and twenty from hepatitis. There were only two syphilitic cases under treatment.

H. M.'s 12th Lancers, Head Quarters and Right Wing.

During the twelve months that the Wing of this Regiment has been stationed at Secunderabad, they have occupied the new barracks at Trimulgherry. They were the first troops to take possession of them. The men suffered from the same complaint which affected the 1st Royals, but not in the same proportion. During the construction of the barracks many thousand coolies were employed for a length of time, and no means were adopted to preserve cleanliness; they had no latrines provided them, consequently their ordure was scattered all over the surface and in the ravines around. No drainage was provided for the Cantonment by the Engineers who planned and constructed the buildings. Consequently, all the wastings from the Barracks and surface-filth everywhere remained as deposited or stagnated into pools, or accumulated in heaps, to be acted on by the sun's rays. The filth from the privies was removed to a place about half a mile beyond the hospital; but this is far too close to the Cantonment. I have frequently solicited the earnest attention of the Director General to the necessity that exists everywhere for the introduction of an improved system of management with regard to privies. In a former report I have given the result of my own experience in this matter, an experience derived from personal observation of the head of an Army on service in Europe, exceeding 20,000 men, and whose habits cannot be compared to those of Englishmen in cleanliness. The success which attended the measures there adopted warranted me in urging the introduction of the same system into this country.

No. 3 Company 3rd Battalion Royal Artillery.

No 6 Company 9th Battalion Royal Artillery.

The sick of the 3rd Company Royal Artillery were accommodated near the men of the Company at Trimulgherry. Those of the 6th Company were placed in the hospital of the Madras Artillery, the men of the Company sharing the barracks with them. The former had twelve sick, out of a strength of 165; the latter nine sick out of a strength of ninety. The accommodation was only temporary, and other arrangements were about to be made which would bring the Artillery together.

Fitting in the new Hospital at Trimulgherry.

A Medical Committee assembled by order of His Excellency the Commander-in-Chief, to arrange for the most appropriate fittings

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and furniture for the new hospital at Trimulgherry. We went very minutely into everything, and, if our recommendations are carried out, there will be no hospital in India that can be compared with this one, both for the extent of accommodation and conveniences of arrangements.

Head Qrs. 4th Bat. Madras Artilery and Details. B. Troops Madras Horse Artillery.

The numerical strength of the Artillery as per margin was 105, and there were thirteen sick in hospital. The women and children numbered in all 180. The hospital and barrack accommodation have been already described. During the twelve months prior to the period of my inspection, six deaths had occurred from the accidental explosion of an expense magazine, and two from hepatic disease. There have been some cases of epidemic dysentery amongst the men, but they were amenable to treatment and had all recovered. The women and children remained quite healthy. The most successful treatment pursued in dysentery was large doses of ipecacuanha and blue pill, generally combined with opium in the early stages and acet. plumbi in the latter.

Cantonment Details.

The parties who receive relief in this hospital consist of the Europeans of the Ordnance and other Departments, of whom there are about fifty and about 2,200 natives, camp followers, lascars, prisoners, and details of Regiments. The prevailing disease amongst the latter is fever, and it is surprizing that syphilis does not appear to occupy so prominent a position in the returns of this as in other divisions. There were fifty-six natives under treatment. The Europeans are treated in the Artillery hospital, there being no accommodation for them in the Detail Hospital, which is merely a cramped ill-ventilated private bungalow and has no pretensions to be classed as a hospital for sick. A practice prevails here of keeping up separate books and making out separate returns for different classes of patients. The only medical subordinate under the Medical Officer, in addition to his other duties, has also to make up prescriptions for the sick of the Staff, of whom there are a large body. His duties give him little period for repose, and his health is consequently suffering. The plan already urged for reducing the number of books and returns, and of having as many as possible of both in blank printed forms would reduce the scriptatory labor of the subordinates one-half. A favorable opportunity now occurs for putting this plan into execution, as the Government have by Minutes of Consultation, No. 1,778, dated 17th ultimo, called on all heads of Departments "to submit lists of the forms required by them, with a specimen of each form." I again earnestly urge on the Director General the consideration of this subject, and beg to tender my services, while I remain at the Presidency, to aid in bringing the plan

SERIES VII. SECTION III. proposed under heading "blank forms" of my general report, dated 24th June 1858, or such modification of it as may be decided on, into force.

Medical Stores. The public building set apart for the Medical Stores is so cramped for space, so badly lighted, and so badly arranged for the purpose, that it has been found necessary to hire a private bungalow, into which one half the stores are placed, which is a cause of much inconvenience for the bungalow is some distance from the proper Medical Store room. It is quite impossible to classify the medicines, &c. Under such circumstances, I beg to recommend that a large supply of printed labels be provided, through the Store Department, to each Dispensary and Hospital, those written by the subordinates for this purpose, being in many cases indistinct. The printed word "Poison" should also be furnished in the same way.

5th Regiment Light Cavalry. This Regiment had just reached the station from Bellary, the sick having been left behind. There were only three men in hospital belonging to the Corps, and nine others from the Details of the 2nd and 7th Light Cavalry. The hospital is a capacious well-ventilated and well-raised building, placed contiguous to the lines of the Regiment.

7th Regt. N. I. The sick in this Regiment numbered seventy. The lines of the men are close on the bed of an old tank, the surface of which is swampy and filthy, and to this the Surgeon attributes the large number of sick which had frequently exceeded that now under treatment. The prevailing diseases are fever and bowel disorders, some of the sick exhibited symptoms analogous to those from which the European Regiment suffered; their lines are not far from the barracks occupied by the latter. The hospital is sufficiently commodious for fifty sick, the privy much requires roof-ventilation.

10th Regt. N. I. In this Regiment there were forty-seven sick. The prevailing diseases were fever, but all were amenable to treatment, the lines are well elevated and clean; the hospital is a commodious building, furnished with roof-ventilation, and its basement is well raised; the Surgery is too contracted in space.

42nd Regt. N. I. There were thirty-four sick in hospital, the majority of these were syphilitic cases, either primary or secondary, or rheumatic affections consequent on this disease. The lines of the men occupy an elevated position to the left of the European barracks in the direction of the city. This is considered to be the most salubrious position of all the Native Infantry Corps; drainage from it is secured, as the ground around slopes gradually

on every side. The hospital is well raised and commodious, but the ground immediately around requires to be kept clean, as people from the bazaar as well as from the lines resort to the neighbourhood. In a former report I urged the introduction of a system of latrines, contiguous to bazars and native lines. This is specially required at Secunderabad ; and indeed there is nothing that would tend more to prevent the production or the advance of disease, than the judicious disposal of night soil and similar residues which are produced in large cantonments.

I inspected this Regiment when encamped five miles from Secunderabad. It had just arrived from Bellary, where all the sick, unable to accompany the Corps, were left. There were only eight sick in hospital, all trifling, except one case of pnemonia, which was doing well; Officers and men enjoyed excellent health on the line of march. 47th Regt. N. I.

On the date of my inspection, there were fifty-nine sick in hospital, of these the majority were syphilitic and cutaneous affections. The former with its combinations being the prevailing disease of the Regiment. The hospital is a tolerable building, it is most inconveniently situated, being fully a mile from the Regiment, and it does not afford space at the most for more than forty beds. The crowded state of his sick list obliged the Surgeon to occupy the outside verandahs and the intermediate spaces between the beds. The men's lines are in a low, unhealthy position, close under the Hoosain Saugor tank, and they have usually a large number of fever cases under treatment. 49th Regt. N. I.

I have above contrasted in a tabular form, the average death-rate of the Artillery and Infantry at this station from 1st January 1836 to 31st December 1858. I now append a table exhibiting the sickness and mortality among all classes of troops from the same period up to the end of the past official year.

Years.	European Troops. Numerical strength.	Admissions.	Deaths.	Per-centage of admissions to strength.	Per-centage of deaths to strength.	Native Troops. Numerical strength.	Admissions.	Deaths.	Per-centage of admissions to strength.	Per-centage of deaths to strength.
1836	1,066	2,062	45	193·34	4·25	8,016	4,547	87	56·72	1·09
1837	1,123	2,200	138	195·75	12·29	7,829	3,563	122	45·51	1·56
1838	988	1,955	63	197·88	6·38	8,286	6,458	209	77·69	2·32
1839	1,127	2,423	75	215·0	6·66	8,147	7,443	187	71·36	2·29
1840	868	1,832	31	211·06	3·32	9,052	6,042	110	66·75	1·22
1841	1,113	2,425	40	217·70	3·60	11,244	6,885	152	61·23	1·35
1842	1,591	2,961	71	186·11	4·46	7,821	5,532	191	70·75	2·44
1843	1,116	1,992	90	178·50	8·06	13,569	8,005	400	59·0	2·95
1844	1,199	1,919	65	160·05	5·42	9,558	7,144	193	74·75	2·02
1845	2,121	3,423	82	161·39	3·87	10,216	7,895	94	77·28	0·92
1846	1,276	2,308	76	180·88	5·96	7,040	5,154	270	73·21	3·83
1847	1,343	2,146	44	159·50	3·35	8,595	4,482	68	56·50	0·85
1848	1,409	2,195	37	155·79	2·63	8,101	4,325	63	53·39	0·78
1849	851	821	8	96·47	0·94	7,130	5,484	52	76·91	0·73
1850-51	1,293	2,218	35	171·62	2·71	6,785	5,377	120	79·25	1·77
1851-52	1,323	2,358	64	178·23	4·84	6,788	4,165	42	61·36	0·62
1852-53	1,293	2,298	14	177·72	1·08	6,701	4,326	51	61·56	0·76
1853-54	1,287	2,191	18	170·24	1·40	6,484	5,174	213	79·75	3·28
1854-55	946	2,199	43	236·41	4·54	5,647	4,892	60	90·41	1·06
1855-56	1,117	2,491	23	223·0	2·06	6,505	6,148	65	94·51	1·0
1856-57	1,016	1,647	16	162·10	1·57	5,306	6,043	63	113·32	1·19
1857-58	1,606	1,493	18	95·20	1·12	3,496	3,743	36	111·87	1·03
Total	27,072	47,555	1,096	3923·94	90·51	1,72,316	1,22,827	2,848	1616·08	35·06
Yearly average......	1,230·54	2,161·59	49·82	178·36	4·11	7,832·54	5,583·04	129·45	73·45	1·59

On the morning of my visit to this establishment, there were thirty-two sick in hospital, and twenty-six had received relief as out-patients. The Dispensary was opened 5th April 1852, the following is a memorandum of the total treated from that date until the end of 1858. The last two years' admissions are considerably under that of the former periods quoted.

SERIES VII. SECTION III. Civil Dispensary and Lock Hospital.

Years.	In-patients.	Out-patients.	Total.
1852	436	1,137	1,573
1853	498	1,409	1,907
1854	874	4,751	5,625
1855	1,310	7,537	8,847
1856	1,417	7,084	8,501
1857	1,042	5,474	6,516
1858	505	1,354	1,859
Total......	6,082	28,746	34,828

There is a marked reduction in the number of syphilitic cases treated generally in the hospitals at Secunderabad since the Lock Hospital was opened. Take for instance, 3rd European Regiment.

	Admitted.	Cured.
From 1st January to 31st December 1857.....	293	284
Do. do. 1858.....	121	106

and nine only remaining on the date of my inspection. This diminution in the number of applicants for relief does not arise from any diminution of syphilitic disease at the station nor from any relaxation of the measures used to induce sufferers to apply for medical aid, but solely as Mr. Cole, the able Principal Medical Officer of the Hyderabad Subsidiary Force, explains, because of the frequent changes that are taking place in the medical superintendence of this hospital, whereby the confidence which is reposed in one medical man by the class who seek relief at the establishment is not extended to another.

It is most important that confidence should be established and retained amongst that wretched class of women, who inflict so much injury on our soldiers. In conveying my views on this subject to the Director General, I was authorized by him to urge on His Excellency the Commander-in-Chief (when at the station), to appoint a permanent Medical Officer to have separate charge of the Civil Dispensary and other duties

SERIES VII. SECTION III.

which at present are made to form an *addendum* to those of such Regimental Medical Officer as may be selected by the Brigadier in Command, so long as his Corps forms part of the Garrison. I therefore proposed to His Excellency, that at the Stations of Secunderabad and Kamptee, an appointment for an Assistant Surgeon should be made who would be denominated "Deputy Medical Storekeeper and in charge of Staff and Details," who would receive pay as follows:—

Deputy Medical Storekeeper............	Rs.	120
Allowance for Civil Dispensary..........	,,	50
Do. for Lock Hospital...........	,,	30
Do. for Staff and Details............	,,	30
Conveyance allowance..................	,,	30
Pay and allowances.........................	,,	250
Total Company's.....	,,	510

which being nearly equivalent to the pay of a 1st class Assistant Surgeon and having fixed duties, the Officer receiving it would be induced to remain until promoted to Surgeon. His Excellency was pleased to order me to introduce the suggestion into my Report, which I now do with an earnest desire that, as it does not add to the present Military charges, it may receive favorable consideration. That the results of the appointment would be attended with vast good, not only in arresting the progress of syphilis, but also in extending vaccination and for alleviating disease generally, I do not entertain any doubt.

SERIES No. 8.

NORTHERN DIVISION.

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SERIES No. VIII.

NORTHERN DIVISION.

The provinces which formerly comprised the Northern Circars extend from latitude 15° to 20° north, and comprehend the districts of Guntoor, Masulipatam, Rajahmundry, Vizagapatam and Ganjam; of these the first, which lies south of the Kistna river, forms now a portion of the Centre Division of the Army, the remaining four forming the Northern Division. SERIES VIII. Topography.

The bay of Bengal extends along the eastern side of the division, a chain of ghauts, running nearly parallel with the coast, separates it on the west from the *Gunwarrah* provinces, which comprise the north-east portion of the Deccan table-land and the south-west districts of the Bengal Presidency: the river Kistna marks its *boundary* on the south, and the Chilka lake separates it from Cuttack district on the north.

The coast, from three to five miles inland, is arid and sandy, from thence for a distance, varying from thirty to sixty miles, it is a rich flat alluvial plain, the surface then becomes undulating and hilly and ascends towards the ghauts more gradually on this coast than I have observed it to do in any other part of India. There are two ranges of ghauts, that next to the sea attains an elevation of from 1,500 to 5,300 feet; separating the ghauts are fertile, well-watered, undulating ranges; after which the hills become broken, and table-land beyond, on which the town of Jeypore stands, has an elevation of 900 feet only above the sea.

The territory in the midst of and beyond these ghauts is almost all subject to the Rajah of Jeypore until the Nagpore country is reached. It is the least known and civilized portion of the Indian peninsula; there are two principal passages or routes to it from the coast, one by Madagole to the south, and the other by Parrattipoor to the north: the latter possesses many advantages over the former, and the chief trade of the country is conducted by this route to the port of Calingapatam.

SERIES VIII. At the period of my visit to this Division, the Government Agent had returned from a political mission to the Rajah of Jeypore. He has favored me with some extracts from his journal, from which, as being perhaps the first true record of that unknown country, I append the following quotations.

"The town of Jeypore is encircled by an amphitheatre of hills from 600 to 800 feet in height, running from east to north and from east to south. It contains about 2,000 houses and from 7000 to 12,000 inhabitants. The main street measures 1,000 yards long and 20 broad, the other streets are irregular, the houses are generally very poor and chiefly constructed of wattle and dab. There are several artificial lakes near the town, and the country around is well irrigated by the streams descending from the hills. My inquiries placed beyond all doubt the fact that this magnificent country paying a tribute of only 16,000 Rupees, has vast resources wholly undeveloped and yields only a revenue of a lac of Rupees amid an anarchy and confusion of management, though capable of producing four-fold that amount, and that the unfortunate imbecile nobleman who presides over it and can boast of an ancestry of 1,000 years, is burdened with debt, without a treasury, existing on the bounty of his very dependants; his most confidential advisers being the most greedy despoilers of his dignity. But this is a mere repetition of the system which has already brought to misery and ruin so many independant Zemindars in the Northern Circars."

"The Rajah and his family are Oodyahs, the majority of his subjects are of the same caste, the remainder are Telingas, and a few Mussulman. Small-pox, dysentery and fever prevail here occasionally as elsewhere, but not in a virulent form, and cholera is wholly unknown. The people appeared generally healthy and in better condition than the ryots below the ghauts: every man carries his sword or his axe, appendages necessary to a people who live in the jungles, as a protection against wild animals. Fire-arms are unknown in the neighbourhood of Jeypore, bows and arrows are common, and the inhabitants are tolerable workmen."

"By the deed of agreement, dated 1803, under which the Rajah holds his Zemindary, the government reserves to itself the right of exercising all police control over the entire territory at their own cost. But from that date to the present, no attempt has been made to establish any Police system. The mistaken impression that their country has acquired for unhealthiness has operated to prevent all intercourse, and

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such a bugbear has this dread of climate become, that, to this day, it is the fixed belief that death sooner or later must result from a visit to these hills. But our recent expedition will in some degree remove these impressions, equally erroneous whether as regards the people or the unhealthiness of the country they inhabit."

The party who accompanied the Agent numbered upwards of 100. The highest elevation attained, viz. 2,783 feet, was the summit of the Bija ghaut in descending; the extreme altitude attained in ascending the Madagole ghaut was 2,701 feet above the sea. During the fourteen days residence amongst the hills, the maximum of the thermometer at noon in tents was 84, and the minimum, observed at 7 A. M., was 42. It was remarked by the party "that the people they encountered in the hills were very different from their countrymen on the plains, they were more sociable and less cringing, in fact the distinction was that usually observable between the Highlander and Lowlander in all countries." This marked difference I also remarked when on a visit to the Galleekhonda, another portion of these ghauts.

SECTION I.

JUGGIAPETT.

SECTION I. Masulipatam Sebundy.

This town forms the boundary between the country of His Highness the Nizam and the British territories. It is on the Kistna river, and there are many opulent traders and bankers in the town. With the view to relieve the detachment of regular troops which hitherto occupied this post, a Sebundy Corps was formed. The Superintending Surgeon of the Division has reported unfavorably on the salubrity of the post; but I see no reason to believe that the evil results which he anticipates are likely to follow on its occupation as proposed. At the period of my visit the Corps was only in course of formation, and the men were not yet housed; their strength was 180, and there were no sick on the list.

SECTION II.

BEZWARRAH.

SECTION II. Sub-Collector's and District Engineer's Dept.

Great works have been in progress at this place for some years. The river Kistna at Bezwarrah passes between elevated lands. A bund or anicut has been thrown across the stream in order to cause the water

SERIES VIII. SECTION II.

to diverge into the canals on each side suitable for traffic and for the irrigation of the country; thus conferring a blessing above all price upon the inhabitants, who were heretofore exposed to terrible famines from the chance-failure of the monsoon rains. On the occasion of my visit, the numerical strength of the party employed on the works was 3,000, of whom there were forty to fifty Europeans and East Indians. Accidents of a severe nature were not of unfrequent occurrence, but the general health of all parties was good, and there were but six in hospital. Wounds and contusions as may be anticipated form the bulk of admissions. Intermittent fevers are also common; the hospital is nothing more than a shed closed in, and is not deserving of the name. Supplies were in sufficient quantity and everything was good and well arranged.

SECTION III.

MASULIPATAM.

SECTION III.

This is the principal town in the district of the same name. It is the head-quarters of the Collectorate, and of a Regiment of Native Infantry. It forms also the depôt for Commissariat and Ordnance stores proceeding to the upper provinces. The Cantonment is on a sandy ridge, little elevated above the sea; in spring tides, much of the ground around is under water, and during the monsoon it is little better than a morass, but in the hot season the greater part of this swamp dries up by evaporation. The seasons resemble those of Madras, and although the climate feels hot and moist in the hot season, the temperature is under that of Madras, and the cold is more intense in the cold season.

Station Hospital.

The Hospital noted in the margin is situated in the Fort, there are also other public buildings as the Arsenal, Commissariat godowns, and buildings which at one time were occupied by a Regiment of European Infantry. The Fort is surrounded by a salt morass and a wide deep ditch, into which the tide ebbs and flows, agitating and carrying with it each time a quantity of surface filth and mud, until about a depth of six feet has accumulated, and the ramparts are sinking into it. The barracks in the Fort were some years since abandoned in consequence of the terrible mortality, ten and half per cent., amongst the European troops stationed there. During the rains the only access to the Fort is by a causeway to the pettah, from whence all the water used for drinking has to be brought, there being no good water inside. There are usually

a good number of sick Europeans in the Hospital, convalescents, arriving from up-country, or sick attached to parties proceeding thither. On the occasion of my inspection there were thirty-three convalescents in the hospital, chiefly men from the 1st Royals at Secunderabad, a temporary improvement is usually visible shortly after reaching the coast, but the men do not become invigorated; doubtless were the position, a more favorable one, the recovery would be more enduring. But apart from the insalubrious spot on which the Fort is placed, the height of the hospital wards is only twelve feet, there being no means of ventilating the building; the windows and doors are constructed of teak boards and a prison-like wall surrounds the entire building, including the privies, which are in an offensive state in consequence of the drainage to the ditch being clogged up by the mud. SERIES VIII. SECTION III.

This Corps has only recently returned from the Straits, where the men appeared to have suffered, as indeed Regiments usually do, from that indefinite form of disease, which passes under the denomination of beriberi. I quite agree with Dr. Morehead in condemning the further use of this term in medicine. With him I regard the disease as nothing more or less than general dropsy; in a large number of cases associated with a scorbutic condition of the system. Each case should be considered separately, with reference to particular organs, heart, liver, skin, kidneys, nervous system, and the treatment conducted on general principles; when that obscure symptom, burning of the feet, is present remedies which act directly on the nervous system in combination with proper diet, stimulants, &c., to improve the condition of the heart, increase the irritability of its muscular fibre, and to remove the dropsical effusions by such evacuants as are suited to the case. The great difficulty which meets us in the treatment of this affection in natives, is the absence of all control over their diet. Hence the fact of the rarity of the malady in the European constitution, is in great measure caused by their different mode of living. The climate of the Straits and of Burmah would, I believe, be congenial to natives, as it is to Europeans, if their diet could be more equally assimilated; as it is, I am assured by Medical Officers who have had charge of Sepoys in the Straits and elsewhere, that it is a common practice with them to strict themselves almost to starvation, in order to be able to make something by the sale of such portions of their rations as they may be able to accumulate. The Apothecary of the 27th Regiment informed me that when in Penang, 27th Regt. N. I

SERIES VIII. Section III.

he and his servants had only to send to the Sepoys' lines, and they could procure any quantity of ghee, rice, &c. In the month of December 1858, the Surgeon of the Regiment addressed the Superintending Surgeon of the Northern Division on this subject, pointing out how the enfeebled constitutions of the men, thus induced, rendered them liable to disease and added to the pension list.

Civil Dispensary.

A private bungalow is now occupied for this establishment. A new hospital being in course of construction. Patients come for relief from great distances, and the usefulness of the institution is annually on the increase as the following table exemplifies.

In 1842	when established ...	33	received relief.
,, 45	in and out patients...	521	....	do.
,, 48	.... do.	 1,499	....	do.
,, 51	.... do.	 3,284	....	do.
,, 54	.... do.	 6,392	....	do.
,, 57	.... do.	 6,855	....	do.

and the numbers continue about the same ratio. Slight febrile affections, ulcers, cutaneous diseases and syphilis form the large majority of the admissions. There were only twelve in hospital at the period of my inspection.

Jail Hospital.

I found 183 male prisoners in the jail and 17 female. There were only a few trifling cases in hospital. Here again I observed lunatics mixed up with the sick for want of more appropriate accommodation; the prisoners generally looked strong and healthy; the wards are clean and tolerably ventilated, and I found here, what I think would be a great improvement to many other prisons, a small ventilated privy closet separated from the prisoners by a teakwood door, this is a great improvement over the system usually adopted of furnishing each man with an earthen vessel intended to contain the fæces and urine voided during the night.

SECTION IV.

Ellore.

The town of Ellore is situated fifty miles north of Masulipatam.

Section IV. No. 4 Recruiting Depot.

Formerly a Regiment of Native Infantry was stationed here, but at present it is only occupied by the Recruiting Depôt noted in the margin; the families of three Regiments on foreign service also reside here. The strength of the depôt at the period of my inspection was 1,374, of whom

there were thirty-four under medical treatment. Small-pox and cutaneous affections were the prevailing diseases. The Medical Officer was using his best endeavours to secure a good supply of vaccine lymph, in order to protect the Recruits on enlistment, but without success; both that supplied by the native Vaccinator and received from Masulipatam in glasses having failed. I made application to the Residency Surgeon at Hyderabad to forward a supply for his use. The hospital was clean and well arranged, and Medical and Commissariat supplies were in good condition.

SERIES VIII. SECTION IV.

SECTION V.

DOWLAISHWARAM.

SECTION V.

In 1846, an anicut or dam was thrown across the river Godavery at Dowlaishwaram; about forty miles north-west from the anicut, the river enters the district of Rajahmundry through a magnificent gorge in the hills, upwards of a mile in length; the depth of the water in some parts of the gorge is 150 feet, the surface of the bed of the Godavery being forty feet above high water level. The hills on each side of the stream ascend from 500 to 2,500 feet, presenting a very picturesque view, the stream at this point being about half a mile in breadth. There is nearly sufficient water in the Godavery at all seasons to admit the ascent of flat-bottomed boats to the village of Chinnoor in the Nizam's country, 250 miles from the sea and within 150 miles of Secunderabad. This is capable of being extended by the Mangera river, one of the feeders of the Godavery to within thirty miles of the same station.

Navigation of Godavery.

The river is about to be made navigable to Chinnoor, and it is further proposed to extend the water communication to within fifty-five miles of Chanda, and eventually by the Wyen Gunga river to Nagpore. When this is carried out, the entire distance from the sea can be accomplished in three days by means of swift powerful steamers. In company with His Excellency the Commander-in-Chief and others, I explored the Bison hill, one of the most elevated hills on the gorge. Its summit is 2,450 feet above the level of the river, the ascent is gradual, the distance by a path constructed by a Company of Sappers, whom we found at work there, is five miles. The plateau land on the summit is about four miles in length by one in breadth. A bed of laterite 300 feet in depth rests on primitive trap, and just at this point a stream of good water flows, but none was found at a higher elevation. It was anticipated

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that this would be a desirable position for the Invalid European soldiers from Secunderabad, in the event of the route by the Godavery being adapted for sending them to the coast; but I have since learned that the party of Sappers at work on the hill was withdrawn, in consequence of having become so prostrated and reduced from fever contracted in the construction of the road.

The Godavery, where the anicut is built across, is four miles wide; there are three small islands in the stream which act as abutments, on which the walls of the dam rest. From the bed of the dam, one canal passes to Ellore, another to Masulipatam, and a third to Samulcottah and Cocanada; the Ellore canal will communicate with the Kistna at Bezwarrah, thus a distinct communication will ere long be secured from the sea at Cocanada, which will be the safest, the quickest and the cheapest route for troops and stores proceeding or returning from Secunderabad.

Port of Cocanada.

As a port, Cocanada is far before Masulipatam, the town is of comparatively recent growth. It is 400 miles by land north-east of Madras, situated on the estuary of that branch of the Godavery, which flows into the sea, north of Coringa bay. It is the main out-let of the delta of the Godavery, is navigable all the year round, and in the course of a few years is likely to become the most important trading port of the Northern Circars. The canal from this port takes the boat into the Kistna river as far as Mootiala, from whence there is a good road to Secunderabad 120 miles, a distance which the ordinary bullock transit will accomplish in three days, the whole time from Cocanada to Secunderabad occupying six days. This will be a vast point gained in the transport of sick to the coast.

Head Quarters Sappers and Miners Hospital.

In the hospital of the Sappers at Dowlaishwaram, there were 41 sick, ten of these were from cutaneous disorders and thirteen from fever and rheumatism, contracted when constructing the road up to the summit of Bison hill. The sick occupied a temporary shed, but an excellent hospital was nearly ready to receive them. The doors and windows of this new building were made of solid teakwood; but this the Engineer said he would endeavour to remedy. The omission of the introduction of roof-ventilation into this, otherwise excellent, building also attracted my attention. I suggest for the consideration of the Director General that all Native hospitals should be constructed on a fixed plan, or that the plan should be submitted to a Medical Officer competent to give a sound opinion on such subjects, prior to the building being entered on.

In the Civil Dispensary, there were only six sick in hospital, the building in which they were accommodated is a poor cramped, ill-ventilated place; the strength of the workmen employed on the anicut, and its irrigating channels exceeds 5,000 Natives, besides Europeans and Indo-Britons. There are Government workshops and foundries where a steam Engine is constantly employed, and vast quarries in the vicinity. Wounds and injuries form the majority of the cases admitted into the hospital.

SERIES VIII. Section V. Civil Dispensary.

SECTION VI.

Rajahmundry.

I found the following sick in the Station Hospital of the place; eleven from the Collector's department, twenty from the Sebundies, and seven from the Detachment 46th Regiment Native Infantry, the great majority being under treatment for syphilis and its combinations. In the jail there were fourteen sick, five of these being maniacs. The jail consists of a succession of bomb-proof, low, ill-ventilated buildings surrounded by a wall twelve feet in height; it is calculated to hold 400 prisoners, I was informed, allowing two feet to each; there are now 165 incarcerated, and the space appeared to me contracted for that number.

Section VI. Station Hospital and Jail.

The Civil Dispensary was established in 1850, in that year 101 sick received relief. In 1855 the number treated amounted to 1,284, and in 1858 they amounted to 3,879. On the morning of my visit there were 149 on the books, 44 in-patients and 105 out. The Medical Officer informed me that syphilis here also is the great pest of the place, and the females admitted into hospital are chiefly from this disease. In fact, that few respectable females seek admission in consequence of the number of deplorable syphilitic cases which usually fill the wards; when I visited the establishment I witnessed cases in females in every stage of the disease, and at every age from the child of five years old, to the old hag of sixty. Both the Station Hospital and the Civil Dispensary are erected on rising ground, the latter building especially is well-ventilated, everything within is well arranged; the grounds around and the out-houses are kept particularly clean.

Civil Dispensary.

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SECTION VII.

SECTION VII.

SAMULCOTTAH.

1st Extra Regt.

There were seventy-seven sick in Hospital of the Regiment noted in the margin on the morning of my inspection. The general average for three months previously had been eighty. The prevailing diseases were syphilis and a light form of ague. The Cantonment is placed in the lowest, and sanitarily considered the worst, position that could have been selected. It is six miles from the sea and little above its level; two miles beyond the present site the ground rises, and there is an area of about a mile in circumference fully 100 feet above the sea, with a gentle slope on every side which secures free drainage.

There is now free communication by canal from this station to Dowlaishwaram, and from thence to Ellore, as already observed, a channel is being constructed to communicate with the Kistna from Ellore, and another channel is being formed from Samulcottah to Cocanada, a distance of six miles; ere long there will, therefore, be a canal communication,

1st.—Direct from Masulipatam to Bezwarrah.

2nd.—From Cocanada to Bezwarrah; and

3rd.—From Cocanada to Samulcottah and Bezwarra, from the latter place, the Kistna is navigable for thirty to forty miles up the stream.

The superior advantages which the port of Cocanada possesses over that of Masulipatam will make Samulcottah the chief Depôt on this coast for communicating with the upper provinces, for the low swampy nature of the ground at Cocanada will be a bar to establishing the Depôt there. It is a fortunate circumstance therefore, that so very desirable a position exists at this station on which the Depôt can be placed.

Dr. Donaldson of Samulcottah informs me "that a good sea-side "sanitarium for the station is available at a distance, called Oopada, "equi-distant from Cocanada and this station, about twelve miles north-"east of both, and so happily resting on a promontory rapidly stretching "out to sea, that the south wind which prevails for six weeks or more "here, and which at Cocanada is long shore-wind, is there a pure and "cool sea-breeze; indeed the south-west wind may also be called a sea-"breeze at this favoured spot. There is a considerable native village "on the spot, and an excellent elevated position for European convale-"scents; lastly, there is a good harbour and anchorage for ships."

SERIES VIII. SECTION VII.

This Medical Officer brought to my notice a system of treatment of fever in all stages which I shall briefly advert to here in his own words. " Doubtless you have heard or read of the web of the black spider being used many years since in agues. Dr. Gellespie nearly 100 years since, in the Isle of Man, and Dr. Jackson in the West Indies in 1801, were the first, I believe, to speak of its effiacy, and Dr. Watson mentions it in his lectures as a 'curious remedy, said to have been successful;' but, I believe, its virtues are quite unknown to the mass of the profession." He then illustrates the successful results which have attended the administration of the remedy in his hands, in cases in which all our other febrifuges had failed to arrest the disease; and, concludes by stating, " that in ordinary quotidian fevers, I order the cobweb to be given in five grain pills three times a day; in tertain or quartan agues, I add one pill daily; in remittents, I do not wait for the remission, but pre-mising a purgative, I commence immediately with five grain pills every three hours night and day till the fever abates. In continued fever I use it nearly in the same way, but have given as much as ten grains at once and five grains every hour or oftener till I saw the worst symptoms broken, and the patient begin to rally. I have never observed an unpleasant effect of any description from the exhibition of this curious remedy, on the contrary, one of its great virtues seems to be the wonderfully curative action it possesses upon the troublesome concomitants of fevers and agues, viz, disordered action of the liver, enlarged and tender spleen, diarrhœa, &c. I am about to extend my trial of the virtues of cobweb to certain other diseases attended with febrile action; and I shall report to you the result when I shall have acquired sufficient data upon which to form a correct judgment."

SECTION VIII.

Cocanada.

SECTION VIII. Head Quarters of Collectorate.

I have dwelt elsewhere in this report on the advantages on the port of Cocanada. I have but little more to add; already there is a considerable community of Europeans at the port, and Commercial establishments of some magnitude are sprung up in and around the town. The main street exhibits daily a scene of bustle and commercial activity, and when the Godavery navigation is open towards the Nagpore country, Cocanada will become a still more important place, for it will then be the port of shipment for all the cotton, which is now conveyed from Berar by tedious land

SERIES VIII.
SECTION VIII.

journey to Bombay. Already Cotton Screws and Dredging Machines are in active operation, and transit passenger boats leave the bridge every evening, and radiate by various channels to Ellore, Coringa and Nursapore, and ere long, by the same means, the traveller will be able to extend his journey to Masulipatam and Bezwarrah on the south, and Vizagapatam on the north.

The chief trade from this port is carried on with London, Bourbon, and Columbo; the exports to London are chiefly sugar, oil-seeds, deer's horns, cotton and indigo. To Ceylon and Bourbon the traffic consists of rice, gram, tobacco, beetle-nut, and articles suited for the use of the Emigrants in those Islands. I have dwelt thus long on the comparatively insignificant port of Cocanada in order to urge the necessity for the introduction into this rising Settlement of judicious sanitary rules, whilst the place is still in its infancy. The streets should be of sufficient width, and provided with pavement and gutter, the houses should be well ventilated and built on a plan; the godowns which are springing up in every direction should be built with regularity, due space for each wharf should be allotted, and above all, a system of drainage should be enforced, so that the surface drainage and the sewage from the houses should be conveyed by separate channels, the former by means of the gutter running parallel with the pavement, the latter by means of covered drains into one general conduit, which would convey the sewage into the stream at a distance from the town. I earnestly urge these very essential sanitary points on the attention of the Director General, and recommend that action be taken in the matter before vested interests will render these evils difficult to remedy.

Seaman's Hospital and Civil Dispensary.

There is a Seaman's Hospital and Civil Dispensary at Cocanada, the Medical Officer in charge was Dr. Donaldson, as a temporary measure. The hospitals were opened in 1856, and much relief is afforded to seamen and others who resort to them; there is accommodation for ten Europeans and ten Natives, and four Females, the building is well ventilated and well raised, but the space is not sufficient in the building for the wants of the place. It is situated on the Juggernaikpoorum side of the town, and it appeared to me that the site which it occupies is far from being the best that could have been selected. Syphilis is the great disease of the place, the Native town around the hospital abounds with brothels of loose women, and shops of cheap intoxicating liquors. European sailors, admitted into hospital, pay a certain sum per diem while they remain there,

SECTION IX.

VIZAGAPATAM.

The town and fort of Vizagapatam is situated on the coast in north latitude 17° 41′ and east longitude 83° 42′ on a small bay. Within the fort are the barracks for European Invalid soldiers, the Arsenal and various public buildings. Immediately outside the Fort gate is the Garrison Hospital, contiguous to the Pettah are the lines for a Native Infantry Regiment, occupying a confined spot with elevated land in front which shuts out the sea-breeze, and further to the north is the Cantonment of Waltair where all the European Officers and the civil community reside. This is perhaps the most salubrious spot in the Madras Presidency, and is much resorted to by visitors from inland stations during the hot weather. The long shore winds so relaxing to Europeans in other parts of the coast are obviated here by the peculiar position of the coast which converts it into a sea-breeze and the hot land winds are almost unknown, being intercepted by the proximity of the hills. His Excellency Sir Patrick Grant fixed on this place as a favorable position on the coast for an European Regiment. Surgeon Maclean, the former Garrison Surgeon of Vizagapatam, and a Committee of Medical Officers had reported most favorably on the locality prior to my arrival there in company with His Excellency.

Garrison Hospital.

Dr. Maclean, Deputy Inspector General and Professor of Military Medicine, Chatham Military College, when Garrison Surgeon at this place, thus correctly described the Garrison Hospital. "The building is quite unsuitable for the purpose to which it is applied. It was not constructed for a hospital, and the whole of its internal arrangements bear testimony to this; its site is most objectionable, immediately in rear of it is a tidal swamp, from which at certain hours of the day and night the most unsupportable odours proceed. But if the upper part of the house is open to such objections, what is to be said of the miserable places on the ground-floor devoted to the treatment of women and children; it has never occurred to me to see, in any part of the world, wards so completely unsuited for the purpose to which they are devoted. I declare conscientiously that during the months of my charge, three-fourths of the patients in the so-called wards have not only derived no benefit from medical treatment, but have left in a worse state of general health than when they entered."

This hospital has been rented by Government for eighteen years—at Rupees 64 per mensem; a sum, therefore, of Rupees 13,824 has been sunk on this worthless building. The strength of the European Veteran Company was 102, and fifteen of them were on the sick list. They usually suffer from chronic bronchitic attacks, and from ailments induced by their own imprudence.

Medical Stores.

The Medical Store house is also a hired private apartment, the space for Stores is far two inadequate for the wants of the Division, and there are no wooden shelves for the medicines, which are chiefly placed on the chunam floor.

The Medical Storekeeper informed me that mineral acids are not unfrequently indented for by extra indents, and as this medicine cannot be forwarded by banghy, any quantity, however small, has to be transmitted by cooly.

Detachment 2nd E. L. I.

The Detachment 2nd European Light Infantry consists of 169 men and 20 women and children. The average daily sick since their arrival at the station (in October 1858) has been considerable, but the admissions have been chiefly from syphilis and ebrietas. A Detachment of Her Majesty's 69th Regiment of the line was stationed at Waltair from January till October 1858. Annexed is a table showing the sickness and mortality in the Detachment while they remained there. It will be observed that eight deaths had occurred, six of these being from bowel disorders; the men were, I am informed, young and drunkards; 110 cases of venereal were treated, and the average daily sick in the Detachment, including the venereal cases, amounted to twenty-four or about ten per cent.

38th Regt. N. I.

There were thirty-one sick in this Regiment on the morning of my inspection, thirteen of whom had fever and rheumatism. As already stated, the men's lines occupy a very unfavorable locality. The hospital is close on the tidal swamp above adverted to, while on the opposite side a public road runs close to its walls; it is little above the sea-level, (the ground immediately behind rises to 100 feet) it has no ventilation of any sort when the teak-wood doors and windows are closed; its basement is not raised, and the interior of the building is very narrow. With the present sick list, it is too crowded. The average annual fall of rain at this station is forty-seven inches, and in consequence of the high ground behind the building and the impossi-

bility of providing thorough drainage—the basement of the building becomes very damp.

SERIES VIII. Section IX.

Civil Hospital and Jail.

A very superior building is now in course of erection as a Civil Hospital and Dispensary, it occupies a most favourable position, is open to the sea-breeze and quite overlooks the Native town. Its basement is well raised and it is well ventilated above : the sick, formerly accommodated in very indifferent premises, are ere now in their new hospital. The Jail Hospital is quite a cell without ventilation. The following exhibits the quinquennial admissions into the Civil Hospital and Dispensary from the date of its establishment.

In 1846,	In and Out-patients...............	300
,, 1851	Do.	2,406
,, 1856	Do.	5,281
,, 1858	Do.	6,235

Syphilis and its combinations, ulcers, and other local affections, form the majority of the admissions.

SECTION X.

Vizianagrum.

Section X. 2nd Company 5th Battalion Artillery. 46th Regt. N. I.

The Cantonment of Vizianagrum is by the road thirty-eight miles from Waltair in a northerly direction, and a few miles further north rise numerous ranges of hills. It was from this station that I made my final ascent up to the Gallee Purvatum range, the foot of which lies about twenty-five miles to the southward of the station. The climate, from September until March, enjoys a high reputation for salubrity, so much so as to induce parties from Waltair to proceed thither, in order to escape the enervating effects of the humid atmosphere of that station in September and October. The heat is intense here in May and June, and the cold in winter is greater than on the coast. I found a large number of sick in the hospital at this station, viz. sixteen in the Artillery, sixty-four in the Infantry. Fever, rheumatism and venereal disease formed the large majority of the admissions. The hospital was being considerably enlarged, consequently, every thing around was dirty from the impossibility of keeping the dust out of the apartments occupied by the sick.

SERIES VIII.
Section XI.

SECTION XI.

Chicacole.

Civil Dispensary and Jail.
4th Extra Regt.

This is the principal Civil Station in the Ganjam District, the residence of the Judge and Sub-Collector; it lies four miles from the sea, and the climate is stated to be very healthy. The building used as a Civil Dispensary was formerly a private bungalow, and is not well suited for the purpose to which it is now devoted; including males and females there were sixteen in hospital at the period of my inspection. During the month of February, 360 sick had applied for relief, and the average daily number of applicants is fifteen; the sick of the Jail are accommodated in a separate building, which is capable of taking twenty without crowding; but the roof of the building is too low, and it is not ventilated.

The prisoners all looked in excellent health, and there were only five in hospital. In the 4th Extra Regiment there was no sickness of the slightest importance. A few slight cases of ephemeral fever and syphilis among the young men comprised all. Stores were all well arranged and books brought up.

SECTION XII.

Kimedy.

Section XII.
Civil Dispensary.
Detachment 43rd Regt. N. I.
Kimedy Sebundies.

The hill tract occupying the western border of the Ganjam District is denominated Purlah Kimedy, Peddah Kimedy and Chinna Kimedy; at the first or the most southern the Dispensary is placed. An Assistant to the Government Agent, and the Officer Commanding the Detachment Native Infantry resides here; the strength of the Detachment is eighty-six men, and that of the Sebundies 121. Fevers are the prevailing disease. The station is about 400 feet above the sea, and from April to July it is exceedingly hot. There were only three sick in hospital at the period of my visit; there is also a Pauper Hospital supported by the Rajah, medicines being furnished by the Government. The buildings used as hospitals are of temporary structure and undeserving of the name.

SECTION XIII.

Chitterpore Berhampore and Itchapore.

5th Regt. N. I. Itchapore Jail.

When it was found necessary to abandon the station of Ganjam, on account of the pestilential fever that rendered the place uninhabitable, the Collector's department fixed on Chitterpore on the sea coast as a residence, the military selected Berhampore, nine miles inland north, and Itchapore was fixed as the site for the Jail, for the accommodation of the prisoners of the district.

There were twenty sick in the 5th Regiment Native Infantry at Berhampore at the period of my departure from the station; none of a serious nature, the majority being syphilis. The station of Chitterpore is in medical charge of Assistant Apothecary Howard, M.D., there is no hospital there; a small room eight feet by ten, being the only place set apart for the purpose of dispensing medicines, &c. At Itchapore there is also neither hospital, nor hospital establishment of any description, except the Apothecary in charge.

SECTION XIV.

Russelcondah.

Section XIV. 43rd Regt. N. I. Ganjam Sebundies. Orissa Sebundies.

This is the most western station in the Northern Division of the Army. It is distant fifty miles from the sea, six miles from the fort of Goomsoor, and 736 miles from Madras; its height above the sea does not exceed 150 feet. The surrounding country is very hilly, the hills ranging in elevation from 500 to 2,000 feet, and thickly covered with dense jungle; the climate is not less salubrious than any other part of Southern India; in the summer, the heat during the day is intense, and the nights are oppressive. During the winter months, again the cold is at times piercing. There were thirty-three sick in hospital, chiefly cases of fever, rheumatism and syphilis, but none of a serious nature. The Medical Officer shortly prior to my visit was called on to report on the death of a man, who it was supposed was murdered. Not being provided with "post mortem" instruments, his examination was necessarily very imperfect. This he brought to the notice of the Superintending Surgeon of the Division, by whom he was instructed

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to use his capital case of instruments, in cases in which justice demands an examination, and when post mortem instruments are not available. I am sure the Director General will not sanction the application of expensive Surgical instruments, which are intended to be used in operations on the living, to the purpose proposed.

When the Government Agent proceeds to the Hill tracts of Orissa, a Medical Officer accompanies him; the latter receives his bare pay only, while the former in addition to his large salary, is provided with carriage, &c. I beg to suggest for favorable consideration, that carriage be passed to the Medical Officer also. The duty is attended with much risk, the country being excessively feverish. It is not easy for the Medical Officer to secure carriage, &c., to proceed into those little known regions, he is thus apt to incur risks from exposure and otherwise, which could be remedied if provided with carriage by Government.*

SECTION XV.

Juggernauth Pooree.

Section XV.

61 Men of the E. C. 5th Bat. Artillery.

113 Men of the 1st Suppl. Corps

98 Recruits of the 40th N. I.

When passing through Juggernauth Pooree *en route* to Cuttack, I found the Detachment, as per margin, encamped there. The first on the list was about to embark for the Straits, and the two others had just disembarked from the Steamer " Coromandel" from Madras, and were proceeding to Cuttack. A death from cholera had occurred in the Detachment of the Artillery proceeding to the Straits, but the sick man was speedily separated from the others, and the epidemic did not extend.

SECTION XVI.

Cuttack.

Section XVI.

The town of Cuttack is in latitude 20° 27′ north, and longitude 86° 5′ east. It is the most northern station for Madras troops, and is only 230 miles from Calcutta. The station is placed on the angle by the Mahanuddy and Brahminy rivers, and is reported to be one of the healthiest in India; during the rains these rivers rise with vast rapidity, attaining at times a depth of twenty to thirty feet above their ordinary level in one night. The low country is secured against inundation by solid embank-

* In the season 1857-58 Assistant Surgeon R. Watson died of fever whilst on this duty.

ments, which in some places are sixty feet broad by twenty in height above the natural bed of the stream. The Mahanuddy is at this time navigable for 300 miles above the sea. The country is marshy along the coast and hilly to the west; on the former, salt in large quantities and of the greatest purity is prepared, and the latter region abounds with valuable forest trees; the timber is floated down the river and thence conveyed to Calcutta. Large exportation of rice also takes place from this district. SECTION XVI.

The Mahanuddy runs parallel with the side of the Fort (now in ruins), which is surrounded by a wide ditch containing a considerable depth of stagnant water, inhabited by numerous alligators. The stagnant water becomes most offensive during the dry season, and an exciting cause of disease. But, at the representation of the Medical Officer, this has been somewhat remedied of late. But it ought to be entirely drained off into the river, or the stream admitted more freely into it, for it appears now to be filled chiefly from surface water and by percolation from the bed of the stream.

Hospital 40th Regiment N. I.

The hospital occupies a small elevated piece of ground near the Men's lines. The basement is well raised, the breadth is quite sufficient, it is sufficiently elevated, and a verandah of nine feet deep surrounds the building. I found forty-three sick in hospital; the prevailing disease is syphilis and its combinations, and ephemeral cases of fever. Besides the Regimental Hospital, there are other Medical establishments at Cuttack, but as these are under the Bengal Presidency they did not come within my inspection.

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STRAITS OF MALACCA.

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SERIES No. IX.

STRAITS OF MALACCA.

SERIES IX.

Prince of Wales Island or Penang.

The Island of Penang was the first British Settlement in the Straits of Malacca, and became a British possession in 1786. These Straits connect the Bay of Bengal with the China Seas, and are formed by the Island of Sumatra to the west, and the Malay Peninsula which extends from the continent of Asia in a south-easterly direction. With the exception of a small extent of territory on the Peninsula opposite Penang and the province of Malacca, the coasts on both sides are in possession of Malay chiefs.

SECTION I.

Penang.

Section I.

Topography.

Lies between 5° 14', and 5° 19', north latitude; its north-east point being in 100° 25' east longitude. It is fifteen miles long, and between eight and twelve broad, and contains an area of 160 square miles. The shape of the Island is an irregular quadrangle, diminishing in breadth to the south. The northern part is mountainous, to the eastward it is a level tract nearly three miles in breadth. On the sea board of this valley, Fort Cornwallis and the residencies of the European and Native community have been erected. The surface of the island was originally a dense forest. Now the plains, as well as the sides of the mountains are laid out in coffee, nutmeg, and spice plantations.

The influence of the monsoons, which mark the seasons in India, is not equally felt in the Straits. The south-west is the dry season, and the north-east the wet; November, December and January being the rainy months. But even during the dry months, three successive days rarely pass without refreshing showers. To this and the general moisture of the atmosphere, the perpetual verdure, which so profusely clothes these beautiful Islands, is chiefly attributable. The thermometer on the plain ranges between 70° and 90°, on the summit of Penang hill it varies from 64° to 76° Fah.

Two-thirds of the whole Island are computed to be level, or of gentle inclination. The highest elevation of the Western hill is 2,574 feet above the sea. That of Government hill is 2,544. This last has been long resorted to as a local sanitarium, the ascent varying from fourteen to twenty-three in 100 feet. There is no table-land on the summit, the several sites, on which houses have been erected, having been levelled for building purposes. Dense forests cover the entire surface of the hill; and the ravines, which intersect the projecting points, afford a constant supply of good water.

The geological formation of the hill is primitive, but the peaked appearance so characteristic of a granite structure is not well defined. Some of the summits indeed present the dome-shaped outline of our hills in Southern India. The hill, however, is entirely granitic, the sub-soil formed by the decomposition of the rock below is of a red clayey consistence, varying from one to eight feet in depth. The plains are entirely of an alluvial character, formed by the detritus washed down from the mountains. The granitic formation, as in the Peninsula, is stanniferous, and tin ore has been discovered at the base of the hills.

Nothing can be more delightful than the climate on the summit of the hills, as compared to that below. On the plains, when there is no sea breeze blowing directly on the inhabited locality the climate is considered insalubrious, it is very oppressive, and the air as it reaches this locality becomes loaded with impurities taken up while passing over a large area of swamp and jungle. The climate of the Straits' Settlement generally is exceedingly relaxing, there is no cold and hot season, and very little variation of temperature throughout the year; consequently its invigorating influence in sickness or in convalescence is inconsiderable.

In many of our inland hill stations in India, the rapid cutaneous evaporation produced by the rarified atmosphere conveys unpleasant sensations. But on the Penang hill, the softening and refreshing influence of the sea-breeze, which reaches it in all its purity from the four quarters of the globe, equalizes the unpleasant dryness, and produces a rapid improvement in the health of the European, who is laboring under functional derangement only. Unfortunately the building space on the summit of Government hill is circumscribed. The more western range which is the most elevated is difficult of access, and is supposed to contain no water. It would be difficult, therefore, to secure an appropriate site for the erection of a Convalescent station or

hospital on this hill. That which has been cleared for the purpose is low and contracted in space. Decidedly the best position on the entire range for a Convalescent Depôt, is that now occupied by Government House, and as this building is seldom used, and is fast passing into decay, it would greatly promote the interests of Government were it at once prepared for the reception of convalescents from the Army now serving in China. Ultimately, when the Straits' Settlements become a Colony of the Crown, and is garrisoned by English soldiers, a local sanitarium will become a necessity; and the trial now proposed will determine the advantages of the Penang hill for this important purpose. The island generally, with the exception of a few notorious fever spots, is considered very salubrious. The climate of the high lands is said to resemble Funchal. There is a comparatively easy ascent to the hill and the entire island is intersected with roads.

Province Wellesley.

This strip of coast land extends from the mouth of the Creon to that of the Muda river. It is twenty-five miles long, by eight broad; situated on the Malay Peninsula, immediately opposite to the Island of Penang, from which it is separated by a strait two and half miles wide. The province is computed to contain 140 square miles. It presents a gentle undulating surface, sloping gradually to the sea. The soil in the interior is disintegrated granite, mingled with a large portion of decayed vegetable matter. Towards the coast are sandy belts, or mud flats, flooded at high-water. A few hills of moderate elevation are scattered through the District; the soil in the alluvial plains being of superior fertility, bears enormous crops of tapioca, sugar-cane, &c.

Extensive roads have been made to facilitate intercourse, and numerous creeks afford ready access to the interior. Like the island, the province has an exuberant vegetation. A larger quantity of rain falls in the province than in Penang, and the average temperature is less. Province Wellesley is the more healthy of the two, which is attributed to its being better ventilated. In Penang, a punkah is indispensable. In Province Wellesley its absence is not felt.

The average fall of rain on Penang hill is 110 inches per annum.
In the valley of Penang it is .. .. 68 ,, ,,
In Province Wellesley the average fall is ... 80 ,, ,,
The mean temperature of the province is ... 79°
That of the valley of Penang being... ... 80°

The principal settlement is at Bukka, a place five miles south of

SERIES IX. SECTION I.

the Muda river, and the residence of the Superintendent and European community.

Detachment European and Native Artillery.

The strength of the Detachment of European Artillery at Penang is eighteen. That of the Native is forty-two. The sickness during the past year has been unimportant, and the cases I found in hospital were of a very trivial nature. The hospital accommodation for the sick of both Europeans and Natives is not worthy of the name. Low roof and basement, and devoid both of circulation of air and ventilation. The Surgery and Dispensary attached to it is a dark hut, about ten feet square, and nine feet in height. A more appropriate building for the sick of this force is urgently required.

Hospital 22nd Regiment N. I.

The lines of the 22nd Regiment Native Infantry are upwards of three miles from town. The strength of the Regiment at head quarters does not exceed four hundred men, of whom I found forty-nine on the sick list; the prevailing diseases being diarrhœa and ulcers. The accommodation provided for them in barracks is excellent, the buildings being well raised from the ground, well elevated, and ventilated. The men have only recently removed into these new Barracks, and much has yet to be done in clearing the ground around of the remains of the huts, which formerly occupied the site, in removing exuberant vegetation, and in draining the locality. It would tend to the preservation of the health of the sepoy were he employed when off duty on this occupation. But with a Regiment so feeble as the 22nd, when the men are already on duty every third day, this is barely possible. Here, the sepoy on duty for the day has to walk three miles to relieve guard, he then returns to his lines for his rice, which he has prepared the previous day, takes it with him in a plantain leaf back to his post (having walked nine miles), and there eats it cold. Dyspepsia, and its concomitants, is the natural result—diarrhœa follows, the enervating climate speedily reduces the powers of life, and renders a change necessary. Hence, in part, the expense and inconvenience experienced by Government in transporting so many sick men to the coast of Madras. To avoid this faulty arrangement, which has, I hear, been urged by others in authority, a piece of land was purchased some time since for 3,000 Dollars on which it was intended to erect suitable accommodation for the men on guard to cook their food, and also a more appropriate hospital for the Artillery of the Garrison. I beg to urge this subject for the favorable support of the Principal Inspector General.

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A new hospital is in course of construction contiguous to the lines of the sepoys. But unfortunately the Engineers have attempted to place too much on the original pedestal or raised basement of the old building. The building is not yet roofed in, the walls are of sufficient elevation, and the ventilation promises to be tolerable. But in breadth and accommodation, for the usual proportion of sick in a Regiment at this locality, the space is quite disproportionate to the requirements. It is a double building. The front ward is eighty feet long and eighteen feet broad; and the rear wards have only a breadth of fifteen feet, the length of each being eighty feet, an impossible space for two rows of cots. Moreover, the building can only accommodate forty-six sick in all, whereas room is required for ten per cent. of the strength. I propose to confer with the authorities on this subject when I reach Singapore.

In conservancy matters much is required to be done to preserve the health of the garrison and civil community on the Island of Penang; where there is a tidal flow, such as to be found here, of many feet in the twenty-four hours, and a gradual slope from the base of the hills to the sea, there should be no difficulty in securing a perfect system of drainage. But instead of this, the town sewerage and that of the suburbs and the country around, embracing the site of the Infantry Barracks, is very imperfect. There is an absence of cleanliness, accumulations of filth taint the atmosphere, and the overgrown hedge rows, indicate the absence of prophylactic interference. A bountiful supply of pure fresh water is conveyed to the town by pipes from the base of the hills four miles distant.

SECTION II.

Malacca.

SECTION II.
Topography.

The province of Malacca, the central Settlement in the Straits on the Malay peninsula is 2 14′ north latitude and 102° 12′ east longitude. The territory attached to it lies between the Malay States of Salangore to the north-west and Johore to the south-east. These boundaries are well defined by the rivers "Rasang" and "Linghy." But its northern boundary is an imaginary line passing through the adjoining Native States of Rambonee and Johole, a crescentic bay of the sea with a chain of beautiful islets stretches to the north. The mean length of the Province is forty miles, the average of breadth being twenty-five, comprising an area of 1,000 square miles, and it is computed to contain a population of upwards of 70,000.

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The town of Malacca is situated on the sea about the centre of the southern boundary. It is divided by a river of the same name, which is navigable for small boats from fifteen to twenty miles inland. On its left bank lies the picturesque hill of St. Paul's, on the summit of which are the ruins of the Portugese Cathedral of St. Marie. (This is supposed to be the oldest settlement by Europeans on this side of the Cape, and there are graves in this Church bearing the date 1540.) On its slopes are the Government gardens, and around its base are the Stadt-house (or Government house), the Church, Jail, Hospitals, and most of the houses of the Civil and Military community. The bazaars are chiefly on the right bank of the river, and the streets run parallel with the coast. In these are many substantial houses occupied by Dutch, wealthy Chinese, and Malay inhabitants. Drainage is well attended to, and conservancy generally receives every consideration in the town and suburbs.

The aspect of the country around is undulating and agricultural, presenting extensive tracts of rich cultivation, prosperous gardens, or dense primeval forest. Everything looks luxuriantly green all the year round. Excellent roads intersect the country for many miles inland, and a large number of Chinese inhabitants are annually flocking in to settle as agriculturists. Thermal sulphurous springs are to be found at a place called Ayer Pannas, fifteen miles from Malacca; but there are no volcanic products around; near the coast the laterite overlies granite, and the Islands are of granite, white, red and green felspar being predominant, and mica deficient. There are seven hot springs at Ayer Pannas, within a circle of forty yards; their position being in a mid valley between the elevated ridges clothed with dense forest. The spring constantly evolves fumes of sulphuretted hydrogen. At mid-day, the indication on my Thermometer in these springs was 136°, but before sunrise the temperature rose to 140°. On analysis, the water has been found to contain sulphur and iron, and much faith is placed in its medicinal properties, both externally and internally, especially in cutaneous affections.

The average range of the thermometer in the shade varies from 75° to 85°. The heat of the sun in March and April is intense, but a hot wind is unknown in the province. The mean daily variation of temperature is from 8° to 10°. The mean annual fall of rain is 78 inches, the greater part falling during the north-west monsoon. Old residents complain of the exhausting nature of the climate, for although the tempe-

rature is moderate during the day and the nights cool, the absence of a cold and hot season enervates the frame and renders convalescence from disease tedious. Yet the climate of Malacca is justly celebrated for its salubrity, and is certainly preferable to that of Penang or Singapore. Violent squalls termed "sumatras" rise suddenly from over the Island of Sumatra, opposite Malacca, and blow with much severity from one to three hours.

The produce of Malacca is principally rice, sugar,, sago, tapioca, spices, fruit, &c., as its cultivation extends, so will its importance rise. Already it is an essential appendage to Singapore and it promises to become the granary of the Straits' Settlements. Malacca is held in high favor by wealthy Chinese from Singapore, who resort to the province in great numbers, purchase land, and become extensive cultivators of the soil. Besides its agricultural resources, large quantities of tin, salt-fish, hides, gutta-percha, and some gold, leave the territory.

Town of Malacca.

Two Companies 22nd Regiment Madras N. I. and Detachment Golundaze Artillery.

The troops garrisoning Malacca on my visit to the Settlement, are represented in the margin. They had been located there for two and a half years. The average daily sick of the Detachment of Artillery during the past year, had been $2\frac{1}{2}$ per cent., and that of the Infantry 8 per cent. No deaths had occurred amongst the former, and two only had taken place in the latter ; slight fever, bowel disorders, and rheumatic affections have been the prevailing diseases. Sepoys enjoy better health at Malacca than at the other Straits' Settlements. Every necessary of life is to be had in abundance, and their routine of duty does not oppress them. Were comfortable quarters provided for them, there is every probability that they would be equally as well in health as they are in their own counrty. At present they occupy a a miserable range of barracks with open plank flooring, the walls and roofs being of leaves. The accommodation provided for the convicts, the greater number of whom are murderers transported from India for life, is princely as compared to that given to the sepoys. Many of the latter called my attention to this circumstance, and solicited my intercession with Government on their behalf. I do not, however, mention the circumstance, because of this solicitation, but purely on sanitary grounds, and to enable the Madras Government to contrast the comfort provided for the sepoys sent from that Presidency to garrison the Settlement, compared with that which the condemned felon, transported perhaps for life from the same locality, receives. The

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death of the one would be a gain to the State, that of the other would entail a burden in the shape of a pension to his heir.

The sick are accommodated in a building in one of the main streets of the town. It is badly ventilated, has low roofs, and has not sufficient space for the sick of the Artillery and Infantry. A low wall separates the hospital from the Artillery Barracks, and there is a communicating door between the two back courts to enable the men from the barracks to get water from the well in the hospital court. There is also a connecting open sewer which carries the washings, &c., from the Artillery court and cook-room, past the hospital; added to this, the privies are above and close to the well, and on the slope of the hill, beyond the privies, the dead of the community are interred. Thus the surface water cannot but percolate through the open ground and pass into the well.

In communication with the local authorities, I learn that it has been in contemplation for some years to erect new barracks and hospital. But the construction of these has been postponed from year to year. It is my duty earnestly to solicit the support of the Principal Inspector General to urge on the authorities to provide wholesome accommodation for the Military Garrison of the Settlement.

SECTION III.

Singapore.

Section III. Topography.

Singapore is an Island off Point Romania, the extremity of the Malayan peninsula, from which it is separated by a narrow strait, in many parts not exceeding half a mile in width; this channel was at one time used by ships proceeding to China from India. The average length of the Island is twenty-five miles, its breadth eleven, its superficial area two hundred and seventy-five, and its circumference sixty miles. The surface of the Island towards the interior, averages from twenty to thirty feet above the sea, it is gently undulating, and consists of brown tenacious clay mixed with vegetable mould and sand. Low hills are numerous over the plain, varying from 50 to 200 feet in height. Booketema, a hill on the centre of the Island ascends to 517 feet. The superficies of these hills is a fine clay, beneath are masses of laterite and sandstone.

Like the other Islands in these Straits, vegetation here is most profuse. The dense primeval forest, which at one time clothed its surface, has now given place to extensive buildings, and cultivation for many

miles from the sea; forest is still found in the interior of the Island. Tidal swamps or inlets of the sea penetrate to the interior. But these do not appear to exercise a pernicious effect on the health of the inhabitants, so long as there exists a ready ingress and egress for the tide, and there is no stagnant water or marshy surface. The temperature is very uniform throughout the year. The thermometer seldom rises higher than 86°, or falls below 70°, nor does it vary more than 4° or 5° in the twenty-four hours. To the European constitution the climate is agreeable. Rain is never very constant, but there is usually a fall every week, lasting from one to five hours, and throughout the year the quantity averages ninety inches. The atmosphere is extremely moist, at night there are dense fogs or heavy dews, and during the day when the sun shines out its power is intense.

The climate of Singapore is not equal in salubrity to that of Malacca or Penang It has not the regular alterations of land and sea-breezes, its heat is greater, and from the circumstance of its closer proximity to the equator the influence of the monsoon is less felt than at either of the other Settlements.

When the Island was ceded to the British in 1819, the population numbered 150, chiefly pirates. The last census gives:—

European and Eurasians	2,445
Malays	10,888
Klings (men from the Madras coast) ...	11,735
Bengalees	1,236
Chinese	50,043
Burmese and Siamese	14
Bugis	906
Javanese	3,408
Arabs	117
Total....	81,792

If to the above, convicts, prisoners, military, and the floating population be added, the number would considerably exceed 90,000. The proportion of males to females amongst the native community at the last census was two to seven.

Like the other Straits' Settlements the principles of free trade have always been carried into practice at Singapore. The harbour is spacious, it affords safe anchorage at all seasons, and the amount of shipping

resorting thither, is only second to Bombay. But the Island itself produces little. Nutmeg was at one time a great article of export; but of late years this has almost entirely failed, and the Island is now little more than a mart or entrepot for the transhipment of produce from distant countries and from the rich Archipelago around, the imports, with the exception of those for local consumption, forming the exports, and its present unparalleled prosperity is mainly due to the fact of its Port being free from all charges to the commerce of the globe. The present revenue of the Straits' Settlements is as follows :—

Singapore	Rs.	8,63,689
Malacca	,,	1,72,532
Penang and Province Wellesley..	,,	3,04,216
Total Rupees....		13,40,437
And the expenditure is	Rs.	8,12,529
Leaving a balance of	,,	5,27,908,

which is expended on the Transmarine Convict Establishment, the Military defences and garrison of the Settlements. The chief revenue is derived from the excise on opium and spirits, both of which are farmed.

Military Garrison.

The arrangements for the permanent Military defences and garrison of Singapore have been for some years past in a complete state of transition. Until lately, the sole defence of the Island consisted of Fort Fullarton, which was little more than a Saluting Battery, a few Native Artillerymen to work the guns, and a weak Regiment of Madras Native Infantry; when completed the defences and garrison will be as follows :—

1st.—Fort Fullarton much strengthened and armed with nine 68 pounders and one 13 inch mortar, having very good quarters for half a Company of men. There are no wells in this fort; but a supply of water is secured from the rain which falls on the house-tops and collected by means of pipes into reservoirs.

2nd.—Mount Palmer has five 56 pounders and quarters for a Native guard over the same. But these quarters are badly ventilated and not suited for Europeans.

3rd.—Mount Faber or the new harbour battery is armed with two 56 pounders and two 13 inch mortars; but, as in the former, quarters are only provided for a Native guard.

4th.—Finally, Fort Canning forms a central citadel, commanding the town on every side and over-topping all the other works. It is armed

with fifteen 68 pounders and two 13 inch mortars, on this citadel excellent Barrack and hospital accommodation is being provided for two Companies of European Artillery.

New Barracks affording ample accommodation for a Native Infantry Regiment of the present strength are now occupied by the native garrison. These quarters are well ventilated, the side or enclosing verandah walls are ten, and the centre twenty, feet high. The buildings are judiciously situated; the basement is raised, and the men all sleep on boards and trussels; an excellent range of cook rooms is in progress, and two ranges of privies are completed. But these latter are badly planned, and when they come to be used cannot fail to become a nuisance to the locality, ridge ventilation ought to be introduced into the roofs before the men resort to them.

Temporary new Barracks, calculated for a Regiment of Europeans 1,000 strong, are fast approaching completion at Mount Harriet, Tanglong district, an elevated undulating ground three and half miles from the city of Singapore. These quarters are raised on posts four feet, the floors are boarded, the side walls are of double leaves matted, and they are of great width and elevation; an appropriate position has been selected for the hospital close to good water. In course of time, Barracks of a permanent structure will be erected on the ground now occupied by the temporary buildings, which embrace an area of 240 acres.

Drainage.

Nothing can be worse than the drainage of the town of Singapore. In some places there are broad, deep, foul sewers on each side of the streets, spanned by planks, as an approach to the habitation beyond; other streets are provided with narrow water courses, choked, here and there, with town refuse. Some of the streets have shallow surface drainage, and others none at all. A river of considerable size causes back waters to intersect the most populous part of the town. At the ebb of the tide those expose deep beds of mephetic gasses, which taint the atmosphere in all directions. It is not creditable to the prosperous and wealthy city of Singapore, that this present state of matters should continue, a good system of central and lateral drainage, and a through cleansing of the canals and rivers, is very much required.

Besides the disregard to the drainage of the town and suburbs, there is a want of a proper system of conservancy generally. There is too much underwood, the hedge rows around the town are over-grown,

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and the defective scavengering displays a lax system of hygiene, the correction of which would greatly add to the comfort as well as the health of the population.

Diseases.

The prevalent diseases amongst the Chinese population are cutaneous and leprous affections, phagedenic ulcerations, anasarca and bowel disorders—all in some measure attributable to their gross feeding. The fattest pork and salted vegetables form their chief diet. Fevers often assume a remittent form, and when cholera becomes epidemic its ravages are very great. Amongst the Military, European and Native, febrile affections and disorders of the stomach and bowels are the prevailing diseases.

To Europeans, Singapore is on the whole salubrious. Fevers and affections of the stomach and bowels are their chief ailment. The climate, as has been already stated, is enfeebling to their constitution, and for some time back it has been observed that they are in a more than usual weakened condition on coming into hospital, rendering it necessary to administer malt liquor and extra diets as the chief ingredients in their treatment.

Diet of Europeans Soldiers at Singapore.

Of late, the cost of the merest necessaries of life has precluded European soldiers, at this place, from providing themselves with the common necessaries, which they can so readily procure at a moderate rate in India. The articles entering into their rations supplied by Government are,

1 lb. of bread daily.
1 lb. of beef, five days in the week.
1 lb. of salt-beef or pork every alternate Friday.
1 lb. of mutton every Wednesday.
1 lb. of vegetables (onions and sweet potatoes).
1 oz. of salt.
4 ozs. of rice.
$2\frac{1}{2}$ ozs. of sugar.
$\frac{5}{7}$ oz. of tea, and
$1\frac{3}{7}$ oz. of coffee, alternately.

This gives 16 ozs. of animal food daily to each man.

But from the great inferiority of the quality of the meat, when cooked, it becomes hard and difficult of digestion, and in the opinion of the several Medical Officers, who have frequent opportunities of inspecting the meat, its value at the utmost cannot exceed twelve ounces of nutriment.

In the above list we find leguminous food, considered to afford perhaps the highest amount of sustenance in a given weight, and butter or cheese, the concentration of animal nutriment, are entirely wanting. The farinaceous and saccharine, both highly important, appear also deficient in quantity. In the enfeebling climate of the Straits, the physique of the European portion of the force is apt to deteriorate, without some addition to their rations to supply this deficiency. SERIES IX, SECTION III.

The breakfast hour of the men is 8 A.M., and their dinner is served up at 1 P.M. From this hour till breakfast next morning, the men have no nourishment, save tea and any bread that may remain from their other meals. In India the case is different, for with his balance of pay, a soldier can purchase an extra meal there, which the expense renders impracticable here. The men are unanimous in saying that they do not want more meat; but they particularly request that salt-butter should be allowed them, and this can be procured at Singapore for about one Rupee a pound.

I am of opinion that an additional allowance of nutritive diet is necessary to maintain the health and efficiency of the European force in the Straits; a better description of beef can be procured from Java and the surrounding Islands, and in addition to the present scale of diet, I quite concur in the opinion arrived at by the Military and Medical Committee who have recently investigated this subject, that the following additions be made to the ration of European troops located in the Straits settlements.

$\frac{3}{4}$ lb. of flour daily.
2 lbs. of suet do.
$\frac{1}{2}$ a pint of peas (dholl or beans twice a week) and
2 oz. of salt-butter, or 1 oz. of cheese, daily.

Health of Sepoys on foreign service.

The sepoy on foreign service, it is well known, is very much more prone to disease than he is in his own country; apart from climatic influence, the following reasons are usually cited, as exciting causes for this :—

1st.—Depression of spirits and nostalgia caused by separation from their families.

2nd.—Badly prepared food from ignorance or indolence on their own part, and,

3rd.—Starvation from a desire to make money by the sale of their rations.

I do not attach much weight to the first; the second is deserving of more consideration; but the third is, I believe, in seven cases out of ten,

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if not the main, at any rato the exciting cause of loss of health to the sepoy receiving rations from Government.

As already observed, the Kling population of Singapore number nearly 12,000, under this designation are included all Natives of India from the sea-board of the Madras Presidency. There is but one pauper Hospital at the station, having an average daily sick of 200; almost exclusively Chinese suffering from ulcers and leprosy. The Klings seeking medical aid here are a mere fraction to the Chinese. Without mortuary returns, therefore, we can but infer that they are comparatively free from disease. In the Transmarine Convict establishment, there are now 2,176 natives of India, who work hard all day in all weathers; during the last twelve months, their average daily sick was seventy, and the mortality 4 per cent.; the majority of the sick being under treatment for trivial local injury. In the 210 Klings in the Police force, no death occurred during the year, while in the Native Infantry Regiment, the average daily sick for the year ending 31st July has been eighty-one. The deaths in the same period have been twelve out of a strength of 800, and several invalids have been sent to India.

A sepoy sells his month's ration of rice for $1\frac{1}{4}$ to $1\frac{1}{2}$ Dollar, and buys inferior for 75 cents. He disposes of his ghee, and substitutes cocoanut-oil; and so with every thing else. Both the Convict and the Police man has a comfortable hot meal twice daily. The former has fixed hours for his meals, and the latter is provided with a cook-room at every Police tannah. But the sepoy has usually a considerable distance to proceed on daily duty, and either goes without his proper meal or gets it in a sodden, indigestible, cold state; added to this, when their work falls under three reliefs, the remainder become so enfeebled, that they are unable to continue the duty. In the Regiment now at Singapore there are barely two reliefs, when the Seikh Regiment formed part of the garrison and shared with them in these duties, the sick list went down one-half in the 40th Native Infantry, but since their departure it has again become heavy.

As a remedy for the disadvantages of the present system, I am of opinion, that a local Corps should be raised for general service in the Straits' Settlements, who would receive a fixed rate of pay in lieu of rations, and who, on the expiry of their service, might have a portion of land assigned to them at Malacca.

Medical Establishments at the Straits.

All Civil Medical Establishments in the Straits' Settlements are under the orders of the Calcutta authorities. Medical Officers of the Madras Army hold some of these civil charges, and our Medical subordinates are attached to all of them.

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Instead of having a senior Civil Surgeon at Singapore, I would take leave to suggest for the favorable consideration of the Principal Inspector General, that a "Staff Surgeon" be appointed who would act as Medical Storekeeper, and superintend all Military, as well as Civil duties in the Straits' Settlements. It should be his duty also to attend on the European Artillery on this Island, an Assistant Surgeon might relieve him of charge of the Convict Establishment, and attend to his Medical duties on occasions when the former proceeds on a tour to the other Settlements. Under the present arrangements there are repeated changes of young Medical Officers in the Artillery, and it cannot be said that any superintending authority exists.

In support of my views for the appointment of a "Staff Surgeon," with power to exercise controlling authority over all Departments, Civil and Military, I may state that when Dr. Traill fell into temporary charge of the Artillery, he found that seven men in hospital were consuming nine quarts of beer daily, and when the returns of the expired [month were placed before him for signature, with an average sick of seven daily, the consumption of malt liquor had reached twenty-two dozens or one-quarter cask. One man on milk diet, which consists of a liberal allowance of milk and bread, had the following extras; to breakfast, three eggs; to dinner, half a lb. of mutton, a chicken, and two eggs for pudding, with a quart of malt liquor.

In company with Mr. Cowper of the Madras Medical Staff, I visited the European and Seaman's Hospital, the Native Pauper Hospital and the Convict Hospital.

Seaman's Hospital.

About two miles from town this building, raised four feet from the ground, has been just erected. The outer verandah is eleven feet wide and ten feet high at the outer pillars, four feet of the upper part is shut in by fixed venetians, which admit of free ventilation and at the same time obscure the sun's rays. The inner part of the verandah is fourteen feet high, and the wall ascends beyond some six feet for the roof to rest upon. This wall is furnished with fixed ventilators, sufficiently open ta admit light and air (a better system than usually resorted to in India), and the pent roof is provided with ridge ventilation, beneath which, in the ceiling boards, are openings two feet square, protected by false doors to keep dust from falling and elevated to admit, of egress to the ascending current of air. The sick wards are very spacious, and there are benches and chairs in the verandahs. That this hospital has every comfort is due to the friendly communications between the Medical Officers and the

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Architect in the course of its construction. The Native General Hospital and the Police Hospital adjoins it, and a good Lunatic Asylum is now being constructed within the same compound.

Pauper Hospital.

The Pauper Hospital is a mile further out of town than the last. It is also a new building, very similar to the General Hospital; as yet it has not been occupied by natives, it having been reserved for the sick returning from the China expedition. It forms three sides of a square, having three large wards, with fifty beds in each. Unfortunately there is no water near this establishment. A library, a day room, lavatories, and other comforts are now being formed. Temporary accommodation is provided for the pauper sick, which averages 200 daily, about half a mile beyond the last building.

These establishments are under the special control of Mr. Cowper, an officer who enjoys an excellent reputation, and has the full confidence of the large community of Singapore. I may state that this Officer is in the habit of treating successfully hard, indurated, enlarged glands in the groins by the application of a truss, two to four hours daily. During the past year, he had sixteen Europeans under him for this usually very tedious and troublesome ailment; the truss was kept applied twice daily for two to four hours at a time and all terminated successfully. In some cases the bubo disappeared under four days. But the average period required to cause absorption of the gland was nine days. I have some experience in the successful application of direct pressure by weights to buboes; but that adopted by Mr. Cowper is more under control. This treatment is so simple and efficacious that it ought to be made generally known; I have not met with it before.

Convict Hospital.

I cannot say too much in favor of the admirable reformatory system in force in the Transmarine Convict establishment at Singapore. The inmates are arranged into classes. The first class are free on ticket of leave, and support themselves, subject only to the restraint of appearing at muster on the first of every month. The second and third classes are free from chains, and from them are selected orderlies, peons, &c., to guard the others and superintend their work; the fourth class have light chains; the fifth are heavily ironed; and the sixth are invalids who perform light work within the premises; their strength on the 26th August was,

Male Convicts in the town lines	829
Do. in the country lines	897
Female Convicts	29
Convicts in Hospital	76
Convicts residing out of the lines on ticket of leave ...	408
	2,239

Besides these are the following local prisoners :—

Town Jail, Europeans	10
Do. Chinese and Malays ...	109
Country working parties	109
Total Convicts....	2,557

This large body of men are kept in constant work eight out of the twenty-four hours. The sanitary arrangements within their lines cannot be called in question. They all sleep on raised platforms, their privies are decidedly the cleanest and purest I have yet seen in course of my inspections. These are open to all, without chains day and night, and for the others there is provided, for night use, a well-aired and ventilated recess, off the wards, such as I have so frequently urged to be introduced into our jails in India.

Pearl Hill Singapore, A Company 1st Battalion Artillery.

The strength of the Company of the Artillery, marginally quoted, is reduced to fifty-three, by a Detachment serving at Penang; I found seven on the sick list. During the twelve months prior to my visit, thirty-five had received treatment for fever, and thirty for bowel disorders. These appear to be the prevailing diseases; but no death occurred in that period. The average daily sick has been $4\frac{1}{4}$, and the ratio of sick to strength $2\frac{1}{2}$ per cent. Their ailments are usually of a very mild nature; but as before remarked, the men appear weakly and anæmic, compared to other European residents on the Island. The cause of this being to some extent attributed to the imperfect nutrition their diet affords.

There is no Colony under Her Majesty's rule that has hitherto had a smaller death-rate amongst Europeans, generally, than Singapore; and, in proof of this, Policies of insurance on lives are granted on as favorable terms as can be procured in England. But the diet of the European soldiers, as already observed, is somewhat meagre; they have excellent accommodation on Pearl Hill, overlooking the town of Singapore; they have ample space in barracks; and their hospital which is thirty feet

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long, thirty-six feet broad, and twenty in height, has space sufficient for ten cots. The introduction of vents into the walls, and the ignition of charcoal and salt within the privies, attached to this and other Military buildings, would be a corrective to the foul atmosphere within and a comfort to those who resort thither. I recommend that the Chief Engineer at Madras be instructed to furnish copies of the Order in Council, and sketches attached, on the subject of vents in privies to the Chief Engineer at this place.

Station Hospital.

In the station hospital I found sixteen native sick from the Gun Lascars and Commissariat Departments. They were accommodated in a temporary building adjoining the Regimental hospital, none of the cases were of importance.

40th Regt. N. I.

In the 40th Regiment Native Infantry, I found fifty-seven on the sick list, out of a strength of 760. In the twelve months prior to my arrival, the average daily sick had been eighty-one; twelve men had died, and thirty-seven had been sent to India.

There were admitted for fever	442,	and 2	had died.
Do. do. for thoracic affections	33,	and 5	do.
Do. do. for hepatic do.	7,	and 1	do.
Do. do. for stomach and bowels	210,	and 3	do.
Do. do. for rheumatic affections	166		
Venereal affections admitted	50		
Other diseases admitted	897,	and 1	do.
Total admissions...	1,875,	Total deaths 12	

In my report of this Regiment at Cuttack, I stated that they had but recently returned from Field service at Sambulpore, suffering considerably from fever, and that their health was consequently below par. Shortly after their arrival at Singapore, many of them were laid up with irritable ulcers, and it was found necessary to remove these to a separate building, where some still remain. But in appearance, the Regiment are certainly improved since I saw them fifteen months since. The Commanding Officer has very judiciously introduced a system, which relieves the men on duty at a distance from their lines from returning again for their food. He has requested me to use my influence to provide for his Regiment a flock of sheep through the Commissariat Department; his men, he states, would willingly pay for them, at the rate of 5 or 6 Rupees a head. He also desires to obtain permission to

establish a Canteen, where the men could get good liquor, instead of the drugged deleterious intoxicating drinks, which the bazaar supplies I solicit favorable consideration to these subjects. The hospital is eighty-six feet long by eighteen broad, and ten and half feet high on the sides. It is calculated to contain sixty-six patients, and is tolerably well raised and ventilated.

There are two permanent Civil Medical Officers on the Island, one has charge of the Medical Stores, and is senior over the Civil Departments in the Straits. He has no control over the Military establishments, although he receives and checks their indents for medicines on the Calcutta Stores. The duties of this Officer, and of the Civil Department generally, have not officially come under my review. But I submit, this should not be so. All Medical Staff serving within the range of the circles visited by Inspectors of Hospitals, should come under their inspection, irrespective of the Army to which they belong, or the Department from which they receive their orders.

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BRITISH BURMAH.

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SERIES No. X.

BRITISH BURMAH.

PREAMBLE.

I propose to divide the Report of my Inspection tour in the Provinces of British Burmah into two parts. SERIES X.

Report to comprise two parts.

The first, to comprise all professional and sanitary subjects—all matters relating to departmental arrangements, Civil and Military, the relative duties and qualifications of all Commissioned and Warrant Medical Officers, &c. Each section being prefaced by a few topographical observations relating to the station, barracks, and circle around.

PART I. Sanitary and Professional.

In the second report, I will endeavour to epitomize from the voluminous notes taken by myself during the past five months, from documents politely placed at my disposal by the Commissioners holding administrative authority over these Provinces, and from information scattered in various publications, the knowledge we possess relative to the topography and physical characteristics—the mountain and marine localities, which may now or hereafter be turned to advantage as places of resort for the Colonist or invalid—the natural history, population, religion education, climate, commerce, resources, &c., relating to this, one of the most healthful, luxuriant, and interesting portions of Her Majesty's dominion in the East.

PART II. [Topographical, General, and Historical.

A considerable time having elapsed since the date on which my last Inspection Report (on the stations in the Straits of Malacca) was sent in, I think it right to record here, that my time was occupied during the two latter months of 1860, in preparing a Sanitary report of every Civil and Military station in the Madras Presidency, for Her Majesty's Royal Commissioners, appointed by Parliament to inquire into the sanitary state of the Army in India, in reply to their official list of queries on that subject; and during the first two months of 1861, I was engaged on special duty under the orders of the Madras Government connected with the introduction of Cinchona cultivation into the hill ranges of India.

How engaged, since last report was compiled.

SERIES X.

Period of year when information was collected.
SECTION I.
Stations on the Irrawaddi.
a. Henzadah Civil Department.
b. Myan Oung Civil and Military Department.
c. Prome Civil and Mil. Dept.
d. Meaday Mil. Department.
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II.
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III.
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a. Tonghoo Civil and Mil. Dept.
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V.
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VI.
Amherst as a continental and Calagouk or Curlew Island as an insular sanitarium for European Invalids.
VII.
Tavoy Civil and Military Dept.
VIII.
Mergui Civil and Mily Dept.
IX.
Bassein Civil Department.
X.
Rangoon Civil and Mily. Dept.

PART I.

I will enter in detail on this part as arranged above in the order of my inquiries as per margin, premising, that under instructions from the head of my Department, my inspection has been carried out during the most inclement season in these provinces, *viz.* the extreme heat of March, April and May, the boisterous burst of the south-west monsoon in June, and the heavy fall of rain in July and August; a period when none, save those necessitated to do so, expose themselves to the vicissitudes of this climate. I have not, therefore, had the advantage of examining into matters at a propitious period; for, during the early months, the rivers were at their lowest, or dried up altogether, and the face of the country was everywhere parched; and during the latter, not only were all channels filled to overflowing, but the country around was so flooded, that boats plied everywhere over cultivated fields, open plains and dense forests, and through streets of towns and hamlets.

SECTION I.
Stations on the Irrawaddi.
Henzadah, topographical position.

Henzadah is the first Civil station on the right bank of the Irrawaddi above Rangoon. With the exception of one branch of the river which strikes off to Bassein, a few miles above Henzadah to *debouch* into the sea at Negrais, this town is some twenty miles above the point where the Irrawaddi breaks off into the numerous distinct rivers or creeks which intersect the Delta; and is, therefore, considerably beyond the influence of tides. The native town lies on stiff clay and sand, and runs parallel with the river a distance between threeand four miles, extending inland about 300 yards; the site of the former Military Cantonment and present residence of the European authorities being in rear of the town at the southern end; beyond this is a wide plain covered with rice cultivation in the season, and closed in the distance with clumps of forest trees and low brushwood jungle. As a Military and Civil station Henzadah has (for it is now abandoned, save as an out-post within the district of Myan Oung) always borne a good name for salubrity. On the 28th March, I found 297 prisoners in the Jail. But as these are being gradually transferred to Rangoon, none being retained here in future, I need not dwell on this subject.

Myan Oung, position and topography.

By a recent arrangement the united districts of Henzadah and Therawaddi will have their head-quarters at Myan Oung, lately the head quarters of the Pegu Light Infantry.

It is a large healthy town on the right bank of the river, having a population of about ten thousand people. The civil station is to the north of the town, and like it, is situated on the high bank of the river. It is nearly equi—distant from Prome and Henzadah; is 169 miles by river from Rangoon by the Panlang creek, and eighty-six and a half miles from the frontier station of Thayetmyo. The country around is covered with dense jungle; some elevated table-land lies behind the town, where the soil is light and sandy, with a slope towards the river, but unfortunately there is a swamp between the town and this rising ground. If this could be drained and cultivated, the latter would become a desirable locality for the erection of residences for the European community.

Character for salubrity.

Myan Oung was first formed into a station in October 1854. Its character for salubrity is good, and being on the high bank of the Irrawaddi, it is easily drained, except during the freshes. Usually health is associated with a residence on the banks of a large running stream of fresh water, provided there is no exuberant jungle, the locality be well drained, and the bed of the stream does not become exposed. The long reaches of the Irrawaddi are believed to influence partially and beneficially the direction of the winds, and I have observed throughout Burmah that the inhabitants, whether for this or other reasons, cling much to the banks of streams in their townships and smaller communities, which would scarcely be the case if these localities had been positively unhealthy. Judging from appearances, the inhabitants in this town are robust and healthy. Fever of a mild type is the prevailing disease of the place.

Town Conservancy and Civil Dispensary recommended.

Much garbage and town filth lies unremoved within this town. The establishment of a regular system of conservancy, for the removal of this and all exuberant vegetation, for the opening out of drains, filling up of hollows, &c., and of a Civil Dispensary, under a commissioned Medical Officer, or Sub-Assistant Surgeon, to afford medical aid to the European community, Government servants and inhabitants of this populous and increasing town, and to parties resorting to it from the extensive district, are, I consider, very essential desiderata. Assistant Surgeon Stewart of the Bengal Army, has hitherto been resident at this place in charge of the Pegu Light Infantry, with a medical subordinate establishment from the same Presidency. This Officer's professional services are highly appreciated amongst the native community, and his

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SECTION I.

withdrawal from the place will be much felt. The hospital is a splendid building of teak wood planking and shingled roof, open two feet between roof and walls, raised eight feet from ground, forty feet in breadth, and 120 in length. Medicines and instruments are good and abundant. There are no prisoners at Myan Oung at present, and hereafter only those sentenced to one month's imprisonment will be retained there.

Average temperature. Geological peculiarity. Atmospheric Phenomena.

The temperature during the hot months of March and April ranges from 85° to 100° in the shade, and during the rest of the year from 50°, the minimum, to 85°, the maximum. The south-west monsoon usually commences at the end of May; after the first burst, it becomes steady till August, when the rain sets in more heavy and more constant, ceasing altogether in October, when the cold weather commences, and so it usually is at all the stations in Burmah, in a greater or less intense degree. A bridge of standstone conglomerate crops out of the bed of the river, opposite the northern end of the Cantonment, being the first thing in the shape of stones and pebbles observed along its banks from the sea. It is in stratified loose masses, the surface turned out of shape by the washing away of the soil beneath. A cyclone visited this station on the 12th April 1860, doing much destruction. It commenced from the south about midnight, and going north its force was experienced at all other stations in upper Burmah.

Features of country between Myan Oung and Prome.

The scenery, as observed from the river, which was very tame up to the last station, improves, and becomes more picturesque as the city of Prome is reached. Low hills approach the bed of the river, and in the distance on each side, mountains of some elevation appear. On the right bank the Arracan range, and on the left the Yoma mountains, which running north and south, divide the province of Pegu. The bed of the river here and there skirts low hills covered with dwarf trees, on apparently a lateritious surface, and the water mark of the freshes can be traced on the rocks in the narrow parts of the stream (now in March, fully half a mile in width) from thirty to forty feet high. Between these hills the sandy bed of the river is seen to extend as far as the eye can reach, and a bank with trees is shown at a great distance,which ordinarily intercepts the rise of the water. With the exception of continuous groves of plantains along the banks, and custard apples on these low hills, no other cultivation is observed. As the Steamer passes on, villagers in numbers, with swarms of children, sit idly watching its progress. But no where are there any symptoms of industry amongst them, although the sloping

banks and numerous rich islets, chiefly alluvial deposit, would in any other country, be largely cultivated, for tobacco, &c., as observed on the Lunka beds on the river Godavery.

City of Prome. Topographical position.

The city of Prome occupies a triangular space, having its apex to the west, where the river bounds it. Undulating sandstone hills covered with dense jungle line the north and south sides, the east and north-east, being the base of the triangle, are open; the currents are wafted through this free space at one season, while during the prevalence of the south-west monsoon they sweep over the town in the opposite direction. Were there no other cause, a place thus exposed cannot be salubrious.' But apart from its unfortunate position, it possesses within itself every element which must render it an insalubrious locality; cut up with hollows and deep winding ravines, which for two-thirds of the year are flooded, or swampy, and for the remainder third are covered with rank vegetation, filth and septic poisons contaminating the atmosphere.

Early insalubrity from Zymotic disease.

Thus zymotic diseases cannot be otherwise than prevalent here. Since the British occupation of the province, Prome has always been a most unhealthy station. On looking back into former records, I find the mortality amongst our soldiers and in the Jail referred to as "appalling," "lamentable," "decimating," and such like terms. At one time "cholera" was the disease engendered, or fed when it did come, at another "dysentry, typhoid remittent fever, or small pox." At the date of our occupation, the annual death rate far out-numbered the annual number of births, and the town and suburban population did not exceed 18,000. But yet from its associations, as one of the most ancient of the cities in lower Burmah, and possessing in the estimation of the inhabitants the most sacred religious edifices, and, further, from its being an important exit for one of the richest rice growing districts, although the town has been swept away by fire, and the inhabitants by disease, times without number, it continues to be yearly more and more resorted to.

Happy result of improved town Conservancy on health, and increase of population.

Every means at the disposal of the executive has been brought to bear to introduce an improved hygiene. With the aid of a few prisoners, Major Brown, of Her Majesty's 102nd Regiment Madras Fusiliers, with the advice and counsel of Dr. Corrie, of the Bengal Army, a Sanitary Engineer as well as a Physician by profession, is effecting great improve-

SERIES X.
SECTION I.

ments; stagnant pools are being filled up, wholesome tanks for the reception of good water are being formed, and so far as the means at their disposal admit the place is being levelled. The result is a marked reduction in zymotic disease; a modification in severity of cholera and other epidemics, and for the first known period in its history an equalization in births and deaths. Besides this, the town population has increased in the same period to 25,000, or including the suburban to 32,000. But what is better still, by the consistent and sound exertions of these Officers, the natives, stimulated by the force of example, are being taught the necessity for the removal of all that is radically unsound in this respect around their own dwellings. Formerly the city was a reproach to the authorities, now it boasts of being one of the best laid out and prettiest towns in Her Majesty's eastern possessions.

Undeniable evidence of good results of town Conservancy.

We have here, therefore, undeniable evidence of the happy results of a healthy system of conservancy, a system which I regret to record is not encouraged as it ought to be within British Burmah. It is very much to the want of a salutary enforcement of prophylactic measures throughout the country, that notwithstanding the proverbial prolification of the people, there is so small an increase in the population. A slothful apathy with regard to cleanliness in and around their dwellings, is evidently one great defect in the Burmese character; and yet perhaps there are no other Asiatics to be compared to them in the possession of good sound sense, and in the total absence of caste prejudices, with at the same time a timid, ready obedience to all civil administrative authority. With these good qualities, much might be done if the several Civil Officers would specially direct their attention to sanitary matters on their visits into their districts, and by a gradual but *determined* interference, introduce a system of sanitary reform in the principal towns and villages. Thus, by the construction of roads and drains, enforced position of houses beyond the impure influence of foul creeks and swamps, so as to allow a free current of air, strict prohibition against accumulations of filth, or rank vegetation and jungle around their dwellings, actual results from the improved health of the people would then teach them the benefit of cleanliness; and the Officers, as "*interpres ministerque naturæ,*" in obeying her laws, would have the gratification of beneficially influencing her processes. Now, even during the prevalence of epidemics at Prome, the chief sufferers are those who reside in the suburbs where the benefit of sanitary measures have not yet reached.

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Jail at Prome.

	lbs.	oz.	drs.
Rice	1	9	3
Meat	0	2	9
Vegetable ...	0	14	0
Oil	0	1	1
Salt	0	1	1
Curry stuff...	0	0	8

The healthiest spot, to the north of the city, has been selected for the Jail, which is surrounded by a high wall- where there are an average of 300 prisoners throughout the year. The hard laborers receive rations as per margin, and are employed in earth work, drain cutting, brick-making, Blacksmith and Carpenter's work, basket making, &c. Those sentenced to simple imprisonment receive the same scale of diet with the reduced allowance of 1 oz. and 4 drs. of meat. Each prisoner is allowed annually two cloths, ordinarily worn by the peasantry in Burmah, and one extra for the cold weather, at which period their friends are allowed to add blankets. The satisfactory results of improved hygiene seen amongst the community is evident also amongst the prisoners, the death rate may now be termed ordinary. It has decreased eighteen per cent. in the past two years. The uniform high death rate in this Jail has been partly caused by the nature of the work which the prisoners are employed on, and partly by their over-crowded state when shut up. To remedy the former, Dr. Corrie has recommended the construction of a tram-way on an inclined plane to the base of the hills contiguous to the town, from whence any quantity of earth might be sent down to level and raise the site occupied by this important and flourishing city, leaving open channels only to the broad creek running east and west, which is the direction of the natural drainage of the place.

Native Military Garrison and Police, Prome.

The native garrison, 330 strong, detached from a Regiment at Thayetmyo, are well placed and enjoy good health. I found none in hospital. Dr. Corrie, who has "been at Prome for six years, and at the "time when matters were at their worst, points to the present satisfactory "state of health of the garrison as another illustration of the advantages "of conservancy; not only is the detachment obliged to look rigidly after "the sanitation of their own lines, but they also freely take work in the "Public Works Department, and mess in squads;" both excellent arrangements. During the three healthy months in 1859 and 1860, there were admitted into hospital out of several public establishments at Prome as follows:—

	Average strength.	1859 Admitted.	1860 Admitted.
Garrison.............	200	33	23
Jail....................	300	39	23
Police.................	325	151	316

Over the two former, European supervision enforced sanitary measures around their dwellings, but the latter had not this advantage, and their lines

SERIES X. SECTION I.

were, moreover, situated immediately under the hills to the south, in a position to the rear of the village of Toingo, where the malaria engendered and wafted thither, concentrated and poisoned the atmosphere.

Meaday.
Force in Garrison.
1 Company H. M's. 68th Regt.
3 ,, 11th Regt M. N. I.

The troops garrisoning Meaday, as per margin, send all their severe sick to the head-quarters of their respective corps at Thayetmyo, five miles south. The features of the country between Prome, and Meaday continue undulating and clothed in forest jungle. A few miles above the former place are some lime stone hills which supply Rangoon with chunam. The bare peaks of these hills have been selected by the Burmese as prominent points for pagodas and grotesque figures. Meaday like Prome is on the left bank of the river, on an elevated table land sloping to the water. It, too, has not turned out salubrious. The Burmese assert that the left bank has always been unhealthy, while the opposite is the case with the right. They call the river "the air purifier," and declare that the atmosphere from the dense forests on the "Yoma" becomes purified in passing over to the right bank, where all their chief towns, except Prome, are built. Meaday is about to be abandoned, but more on political than sanitary grounds.

THAYETMYO.

Military Force and Medical Establishments in Garrison.

C Company 3rd Battalion Horse Battery.
Surgeon Major C. Timins.
2nd Apothecary J. Miller.

3rd Company H. M's. 68th Regiment of Foot.
Assistant Surgeon C. Williams.
Assistant Apothecary T. Hall,
11th Regiment M. N. I.

Latitude 19° 20' North.

Longitude 95°12" East.

42nd Regiment M. N. I.
Assistant Surgeon C. Robertson
Assistant Apothecary J. Jones.
2nd Dresser J. Farrael,

Average annual rain fall.

Inches 40 to 50.

33rd Regiment M. N. I.
Assistant Surgeon J. Henderson,
Assistant Apothecary J. Van Hans.
2nd Dresser Govidarajooloo.

Thermometrical Observations.
Max. Min. Men.
105° 45° 78°

Station and Detail Hospital.

Surgeon Major C. Timins, Artillery, in charge
2nd Dresser Vurdarajooloo.

Elevation above the sea 260 feet.

Civil Dispensary.

Assistant Surgeon C. Williams, H. M.'s 68th in charge.
Lock Hospital recommended to be added.

Terse and accurate Topography of Thayetmyo by the Most Noble the Marquis of Dalhousie.

Twelve miles from the line of demarcation between the British and Burmese territories by the river course, and five miles south of Meaday is the great and important Civil and Military station on the western frontier of British Burmah. It occupies a well elevated undulating space, on a super-stratum of gravel and sub-stratum of clay and sand on the right bank of the river, and was selected by the late Most Noble the Marquis of Dalhousie, on its being found necessary to remove the force from Namgan on account of its unhealthiness. Its topography is forcibly and correctly described in the following extract from a Despatch No. 393, dated 14th February 1855, addressed by direction of His Lordship to the General in command of the Division. "The Most "Noble the Governor-General was of opinion from the first, that the whole "of the frontier force on the western side of the Province would be best "placed at Thayetmyo and Meaday * * * * that opinion "has been fortified by Major Allen's report on the frontier, and above all "it derives the utmost additional strength from what is now known of the "natural character of Thayetmyo itself; high, dry, open, cheerful, of unlimited extent, and of unquestionable and proved salubrity. It has "recommendations which no other station in that part of Upper Pegu can "boast of. The lessons and warnings of experience should not be disregarded, and His Lordship in Council thinks that the whole frontier "force, on the western or Irrawaddi side of Pegu, should be placed at "Thayetmyo and Meaday."

SERIES X.
SECTION I.

Table showing the range of thermometer, barometer, and fall of rain, &c., at Thayetmyo, from 1st April 1860 to 31st March 1861.

Months.	Fahrenheit's thermometer. Maximum.	Minimum.	Mean.	Rain.	Meteorological Observations.
April	95·	75·	85·	6·80	Weather fine; winds variable; occasional gales.
May	93·	79·	86·	4·05	Cloudy, thunder; winds variable.
June	87·	77·	82·	12·17	Cloudy and rain, variable.
July	86·	77·	81·	15·55	Do. do. do.
August	86·	77·	81·	7·30	Do. do. do.
September ...	88·	77·	83·	6·10	Slight showers do. do.
October	87·	76·	81·	15·15	Fog and rain, wind N.E.
November ...	83·	72·	78·	9·10	Showers, fog, wind N.E.
December ...	79·	59·	69·	0·0	Fogs in the morning; day clear; wind N.E.
January	81·	54·	68·	0·50	Fogs in the morning; day clear; wind N. N.E.
February	89·	56·	73·	0·0	Fogs in the morning; day clear; wind variable.
March	96·	70·	83·	0·45	Wind southerly.
				*77·17	

Confines of the Cantonment sanitarily considered faulty.

In marking out this Cantonment, there are few who have made sanitary science their study, who will not say that "the lessons and warnings of experience" did not receive due consideration. Instead of going so far inland (some two miles), it would have been better to have extended the Military Cantonment along the river front to the south; beginning from the space opposite that where the bed of the river is exposed during a great part of the year; a feature, as already observed, in river fronts which should always be considered in the formation of new settlements. Reserving this space for a general parade ground, the

* Which is upwards of one-third above the usual average per annum.

PROPOSED PLAN
of
CANTONMENT OF THAYETMYO
as arranged by the Engineer's Department
Submitted to the Committee
on the 6th April 1861.

Supd. Eng. Dept.

Colonel
Chief Engineer.

PROPOSED PLAN

of

THAYETMYO

Shewing the alteration of Limits and Lines proposed by a Committee held at Thayetmyo on the 5th April 1861.

Supt. & Mang. Govt. Lith. Press P.P.B.

Colonel, Chief Engineer, P.W.

station should have embraced the high and undulating land to the south and west with about one-half its present depth inland. On sanitary grounds, there should have been greater separation of the different buildings, Civil as well as Military, in order not only to secure ventilation and an efficient system of conservancy, but also to guard against the loss of life and property, where such inflammable materials as wood and thatch almost alone enter into the construction of all public and private houses. In the position indicated also a very perfect system of drainage could have been secured, and much swampy ground avoided. Being satisfied after very careful examination of the locality and of the Engineer's plan for the re-construction of the Cantonment, that sanitary measures of an important character for the health of the garrison required special consideration, Brigadier Osborne, Commanding, on my solicitation, assembled a mixed Medical and Military Committee, including the Executive Engineer, for the purpose of considering certain proposed alterations of the Cantonment (rendered necessary by a recent destructive conflagration, which in the course of a few minutes consumed twenty-nine public buildings, including fifteen barracks for Europeans); the extension of its limits, and for the investigation of matters relative to its sanitation.

The following copy of the Proceedings of the Special Committee and two plans for the re-construction of the Cantonment of Thayetmyo will render any further detail on my part unnecessary.

Proceedings of a special Committee assembled by order of Brigadier G. W. Osborne, Commanding at Thayetmyo, under G. O. G. No. 325, dated 17th July 1860, and G. O. G. 23rd February 1858, No. 66, on the requisition of the President, for the purpose of taking into consideration the proposed alterations in the Military Cantonment, the extension of its limits, and for the investigation of matters referring to its sanitation. Thayetmyo, 6*th April* 1861.

Proceedings of a special committee to consider the proposed alterations in the Cantonment, by the Engineer's Department with 2 Plans.
1st. Plans by Engineer's Department.
2nd. Revised Plan by the Special Committee.

PRESIDENT.

Doctor D. Macpherson, M. D., Inspector General of Hospitals.

MEMBERS.

Major A. R. Rich, Commanding 33rd Regiment Native Infantry.
Captain T. C. Longcoft, Major of Brigade.
Captain R. Henegan, Commanding Artillery.
Asistant Surgeon Henderson, 33rd Regiment Native Infantry.

SERIES X. SECTION I.

The proposed new plan of the Cantonment is submitted by the Executive Engineer.

Plan of Cantonment.

The Committee having carefully examined the same, is of opinion that the space allotted for the barracks, both of the Artillery and European Infantry, is far too circumscribed, and, as regards Infantry, propose alterations as in annexed revised plan. The space for these lines to extend from A B to C D, namely, to the road running close in rear of the Native Infantry barracks.

Artillery and European Infantry Lines.

Officer's houses to be thrown back and occupy the whole western face of C, D.

Soldiers' Gardens.

The low ground marked E to be partially reclaimed and converted into Soldiers' Gardens.

Commissariat.

Commissariat Godowns to be transferred to the house known as Colonel Dudgeon's, marked F; the whole of the ground now occupied by the Commissariat to be given up to the European hospitals, and buildings attached thereto.

Engineer's Yard.

The Executive Engineer's yard to be removed to the south, marked I (near Captain Duff's house.)

Limits of Cantonment.

The limits of the Cantonment to be extended to the south, to a pillar to be erected, between Captain Duff's house and the old pagoda, and extending westward to G, as marked in the new plan, the intermediate low ground to be drained, roads made, and trees planted, drained and kept as a grass meadow.

Native Infantry Lines.

The high ground now occupied by the elephant sheds to the south-west of the present Native Infantry parades to be reserved for the Native Infantry Regiments and Officers' quarters, as may hereafter be determined on.

Sudder Bazaar.

The Sudder bazaar being at present in close contiguity with the European barracks is most objectionable. The high ground to the north of the present cattle sheds, is proposed for the Sudder bazaar.

Artillery.

The site in the plan marked H for stables and horsekeepers is most objectionable, on account of its vicinity to the troops.

It is proposed that the buildings for horsekeepers, and the stables should be placed on the spot now marked for the hospital, &c., the hospital buildings being brought to the vacated ground and also extended to the Officers' compounds, in the line where the quarters of the Brigade Major are designated in the plan now submitted.

The stables thus being placed in the square marked K will admit of the horsekeepers and grasscutters being located as at present marked L.

SERIES X. Section I.

Quarters for Artillery Officers to be on the present Brigade ground, west of their proposed lines.

Latrines.

Public latrines for the Sudder bazaar, and all Native followers to be built at convenient spots.

Jungle.

Jungle to be cleared up to the boundary lines. Screens of trees to encircle the boundary roads, and trees to be planted all about barracks and hospitals throughout the Cantonments.

River Sand Banks.

The removal of the present sand bank in the river, fronting the Cantonment, by encouraging a body of water to flow towards it, by means of temporary groins of matting and bamboos, or otherwise, would be of great advantage to the hygiene of the station.

Officers Quarters.

The space allotted for Officers' quarters at present, throughout the Cantonment, is far too limited, considering the inflammable nature of the material with which houses are constructed, mat and wood ; as opportunities occur the space should be extended, and the new compounds marked out on a much larger scale.

Town.

Nothing can be worse than the defective conservancy of the town. It appears to have sprung up from squatters settling down, uncontrolled when and where they liked.

The ground occupied is undulating and capable of being built on *by plan* with efficient width of streets and complete system of drainage.

The proposed removal of the Custom House to this locality, and the removal of the town further south on the river front, appears to the Committee to be urgently required.

General Remarks.

The present is a favorable opportunity for the introduction of an improved system of hygiene into this important frontier station, as all buildings (nearly) now standing are temporary and about to give place to others of a permanent and enduring construction.

Observations of Brigadier Osborne, Commanding the Station and views of General Carthew, Commanding the Division on the proceedings of the Committee.

Matters so momentous as the future health of the Garrison of this very important frontier post, require of course to be well understood before put into force. The Brigadier Commanding, in addressing the General of the division, went, therefore, very fully into both plans, as above, in an able paper which must be perused by those who desire

SERIES X. SECTION I.

to make themselves familiar with the subject. The General on the receipt of these papers proceeded to the frontier, and after making himself familiar with the locality, agreed generally with the Committee save in the amount of space, which the latter allotted to Her Majesty's Regiment of Foot. Both he and the Brigadier conceived that this might with safety be reduced to the point marked by two * * in the "plan by the Committee." This line of distance from the river bank happens to be exactly that which I laid before the Committee as my view of the space required for European Infantry barracks; but as the other members of the Board were of a different opinion, I also gave my assent to the recommendation. Under these circumstances, I do not hesitate in concurring in the decision arrived at by General Carthew, after a personal examination. But I am satisfied that to do less in other respects than is recommended by the Committee, will lead to disasterous results in loss of life and in costly expenditure hereafter, to rectify the mistakes in hygiene, which are so self-evident on the face of the Engineer's plan.

O. Co. 3rd Battalion Horse Battery and Arty.

Consequent on the destructive fire above referred to, there was at the period of my visit to Thayetmyo considerable but unavoidable discomfort and over-crowding. In my observations, therefore, on the temporary accommodation for the troops, sick and well, it will suffice to state here, once for all, that it was as perfect and as commodious as circumstances admitted. In the Artillery out of a strength of eighty Europeans, eight were in hospital at the day of my inspection, and during the twelve months previous, the admissions and deaths were as follows:—

PREVALENT DISEASES.

Fevers.		Lungs.		Liver.		Stomach and bowel.		Brain.		Rheumatism.		Veneral.		Cholera.		Other Diseases.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
33	0	1	0	22	1	24	0	7	0	12	0	12	0	0	0	38	0

The total admissions being 149 or 0·56 per annum, and one death from hepatitis, the average daily sick being six. Ninety-four natives

were attached to the Company, amongst whom 161 sick and one death occurred within the twelve months.

Detachment H. M's 68th Regiment of foot.

In an average strength of 300 there has been an average sickness throughout the year of 7½ per cent. There were twenty-nine sick out of 294 on the 2nd April the morning of my visit. Ephemeral fevers, ophthalmia an affection which the Regiment brought with them from Europe, and veneral have been the prevailing diseases. The latter however, predominates above all others. The Medical Officer informs me that always one-third and usually one-half of his sick are in hospital from this cause. In nine months of 1860 there were fifty-eight admissions chiefly chancres; the sores being difficult to heal and usually resulting in syphilitic complications, buboes, &c., rendering the sufferers liable to other diseases. Private Keith now in hospital, in answer to my inquiries states that he contracted a simple sore at this place five months since. He has now copper colored eruption and rupia scales over his person, persistent rheumatism and periostitis ; and there is another similarly aggravated case under treatment ; other diseases are of a mild character ; only one man died in 1860 from disease (Meningitis.) The appearance of the men denotes health. Beef, pumpkins, yams, beans and sweet potatoes on the usual ration for the men in health. All European sick get beef and mutton on alternate days. There is a regular fortnightly communication by Steamer to Thayetmyo with the English mail despatched from Rangoon immediately on its arrival there from Calcutta. This is a great boon to the community. Commissariat supplies good, bedding sufficient, matrasses of tow, sheeting provided to all. In hospital there are 29 sets of musquito curtains. Musquito netting is an acknowledged preventative against fever in malarious localities in Burmah. My inquiries lead me to conclude that a large majority of natives use curtains, and that these often escape fever when others who do not adopt this precaution are prone to it. In camps or in Garrison when Epidemics are prevalent it might be attended with some good results if the open doors and windows were provided with net blinds.

11th Regiment M.N.I.

This Regiment had just completed a twelve months' residence at Thayetmyo when I inspected them, having come from Cannanore. I found twenty-one sick out of a strength of 650, the average sick during the year having been 29 ; the prevailing diseases are rheumatism and syphilis. There have been nine deaths since the arrival of the Corps, and seven were sent

SERIES X. Section I.

away sick. This is a very satisfactory state of matters. The Regiment has excellent, well raised, wooden barracks, and the hospital is a spacious building capable of taking fifty to sixty sick.

33rd Regiment M. N. I.,

This Regiment after a rather harassing march from Kamptee embarked for Burmah in April last year, and although equally well cared for in every respect, it has always had fully double the number of sick that we find in the 11th. I found fifty-four sick out of strength of 715; six deaths have occurred in Burmah from low fever, beriberi and anasarca. The men suffered considerably during the long march to the coast from Kamptee, and to the depressed state of the system from this cause, Dr. Henderson attributes their large sick list as compared to the 11th which was stationed on the western coast at the period of its embarkation.

Station Detail Hospital.

For the reception of all followers in the Public employ having an average strength of 1000, and an average sick list of fifteen. The difference between the sick amongst these followers compared to what we find amongst even our healthiest Native Infantry Regiments, is very remarkable.

The usefulness of the Charitable Dispensary should be extended and Lock Hospital added.

This a very poor place and keeps up a bare existence from private contributions. It is much resorted to and with very limited means does considerable good, but is utterly inadeqnate to the wants of the station. A Lock Hospital should be incorporated with it in a vacant building conveniently situated, available for the purpose. If a correct conclusion can be drawn from the admissions into Hospitals of Europeans and Natives with veneral, the disease is annually on the increase at Thayetmyo, and so it must continue to be when means are wanting to arrest its progress. The money saved to the State by the services of Private Keith, the man previously referred to would go far to cover the extra cost necessary for the establishment of this hospital. The disease is mainly propagated by women from India, few of whom reside within Military bounds. A necessity to success, therefore, will be a cordial understanding between Civil and Military authorities. The building referred to above has ample accommodation, if divided in the centre, for diseased poor, (the only class likely to resort to it) as well as for the diseased prostitutes, for it was one of the best hospitals lately vacated on the reduction of the Native Garrison. As a Civil Dispensary, therefore, and Lock Hospital conjoined, one establishment of servants would be sufficient. It has the additional advantage of being in close proximity to the proposed site for the erection

of the new jail and the Sudder bazzar, and of the Native Town also. I may state further that the Military and Medical authorities at the station concur with me in the peculiar adaptation of the building and the expediency of extending its usefulness, as above proposed; and so far as I was able to ascertain, the Civil authorities are prepared to co-operate cordially with the Military in arresting, as far as possible, this loathsome disease, from which so large a portion of the force ($\frac{1}{3}$ to $\frac{1}{2}$ of the sick) usually suffer. No other two stations in British India are perhaps equal in importance to the two frontier Military posts in Burmah, now that the force has been so much reduced; therefore it behoves Government to consider well every measure which will add to their efficiency. I am informed by Captain Rigg, late Adjutant General to the British Division of the force serving at Canton, during the late war in China, that one of the earliest acts of the French General in command of his troops also stationed at the same place, was a medical surveillance over certain establishments to which alone his men were permitted to resort. The result of his precaution, although unknown to us, we may safely infer must have been beneficial to the French, whereas amongst our Soldiers more than three-fourths of the sick or in the ratio of seventy out of ninety men, were always incapable for duty from the want of similar precautions.

Failure of the Sheep Farm. Proposed establishment of Pork Farms.

The sheep farm, which promised so well at one time has come to an end. Epidemics successively seized on the sheep, by which scores were removed and the recovered were useless as food for man. So now, the only mutton procurable at Thayetmyo will have to be forwarded from Rangoon, where it is purchased from ships, by the Commissariat Department as required. Why should not a pig farm under Chinamen be substituted for sheep farms at the frontier stations? The pork at Rangoon is about the best food procurable there from pigs fed by Chinamen on fruit and vegetables which grow luxuriantly over the country. A ration of pork to the men once a week would be acceptable, as well as salutary; for there can be no doubt that variety in diet will promote health more than the uniformity to which necessity obliges them to submit to. It is useless to argue the determination of the digestibility of individual articles of food; good sense should guide us in this respect rather than specific rules. An occasional ration of salted meat might also be given with advantage.

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SECTION II.

JOURNEY ACROSS THE FRONTIER TO TONGHOO.

Journey across the Frontier to Tonghoo; róute taken.

Little being known of the country traversed by the route over the Yoma range of hills, by the Zadabeen pass, I introduce it here, with some observations.

Route across the Yoma hills by the Zadabeen pass, some fifteen miles from the frontier, in April 1861, by Dr. D. Macpherson, Inspector General of Hospitals.

No. of marches.	Halting ground.	Miles.	Remarks.
1	From Thayetmyo to Yabo..................	9	Cross the Irrawaddi to Yatung; good cart road through bamboo and low jungle. Police post; indifferent water, and halting ground. Elevation above sea 410 feet. Thermometer at noon 98.
2	Myola.....................	10	Police post; good camping ground and good water; tolerable cart road, at one time through low forest as yesterday through long grass; across and along bed of stream Tchong-gou-gee, or some of its tributaries. Thermometer under shade of trees 98 elevation 480. Passed two villages; supplies provided.
3	Myoung....................	12	Road hard and good through bamboo dense forest and stunted teak; passed two villages; cart road as yesterday, descending and proceeding along the dry bed of the river; halting ground good; water good; supplies sufficient. Tabulca, a town of fifty houses three miles to the north; thermometer 100 elevation 486 feet, cultivation oil seed, cotton and paddy.
4	Tangyo....................	12	Country becomes more undulating road open and good for cart all the way; through dry paddy fields and on low ridges; supplies scarce; water good; passed two villages en-route and met nume-

No. of marches.	Halting ground.	Miles.	Remarks.
			rous carts. Thermometer 90° ; elevation 555 feet; direction of road up to this date to the north of east, encamp under magnificient mango trees. Every village we passed stockaded from dread of dacoits.
5	Thackabeen..	12	The early part of the route passed through the same description of dense bamboo and stunted forest. Passed several clearings and patches of cultivation ; cotton and sesamum oil-seed (oil used all over Burmah in cooking) ; passed Chin village of Talopeng on road ; Thackabeen being also Chins; more industrious race than Burmans. Met Captain Blair returning from Tonghoo with forty horses, twenty elephants and numerous followers. Thermometer 88°, elevation 623 feet ; water good.
6	Phodong.........	14	A small Kareen village on the summit of a precipitous hill 200 feet above encamping ground in the forest, on the banks of the Tchong-gow-gee ; no cart road ; path took over a ridge at first, then descends a steep bank to the bed of river, and thereafter continues over steep ascents, and down steep banks, and in the river with treacherous sands here and there, making a tedious and difficult march of seven hours' duration. Camping ground indifferent ; water good. Thermometer 94° ; elevation 1,010 feet. At this village lay in supplies to cross the hills ; halting in the forest where there are no villages for three days.
7	Cavern on the Pass...	14	Route chiefly along bed of stream over its banks and along ridges through elephant-bamboo, and tree forest of cotton, teak and cutch trees ; very steep to attain summit

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No. of marches.	Halting ground.	Miles.	Remarks.
			of the pass. Elephants get up on their knees ; path runs along a ridge about a mile ; greatest elevtion of Zadabeen pass close on 1,700 feet. Camping ground on the east side of the pass, above a deep cavern, formed by the descent of water over the sand stone rock during the rains. The water is clear, good and abundant ; but there is no water on the road intermediately. It is neeessary to take a Kareen guide over these hills. Thermometer 84°, elevation 1,624 feet.
8	Yaneskan......	14	Meaning the only watering plaee. Path at first leads through a diffieult ravine, it then ascends and descends a wild elephant track, full of deep pits from their foot-prints during the rains ; now dangerous to ride over being eovered with leaves. There is a main track, with numerous eross ones into the forest which consists of large bamboos and good sized trees ; water good down a steep descent at some distanee, by digging in a ravine. Gad flies as large as wasps, most troublesome the last three days. Seven hours on the march riding. Elevation 1,444 feet, Thermometer 92°. Road East-North-East.
9	Zadabeen...............	12	A fine clear stream at the foot of the hills ; the path down the descent being easy, through the same large bamboo on the leaves of which our cattle are fed. Thermometer 94°, elevation 630 feet.
10	May-oun-bouk.........	12	A small Kareen village on top of a hill, above very indifferent encamping ground. Here we part with our hill guides. Road chiefly through bed of the Tha-pyeen river ; hard bottom and well shaded.

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No. of marches.	Halting ground.	Miles.	Remarks.
			Thermometer 94°, elevation 562 feet.
11	Wagee................	12	This day's march brings us well out of the range of the hills. Road all the way in bed of the Tha-pyeen, which is rather treacherous from quick sands. Water uniform ankle depth ; dense forest as yesterday. Thermometer 90°, elevation 480. People very civil ; supplies abundant.
12	Sinewah.................	18	Communication by carts commences some miles between this village and Wagee. Cross the Tha-pyeen and its feeders repeatedly, or run parallel with it. Large Teak forest and small bamboos ; more open. Elevation 410 feet, thermometer 96°.
99	Shuy-ay-gay-yay ...	10	A good cart-road all the way ; water very indifferent from wells and scarce. Thermometer 96°, elevation 350 feet.
14	Tonghoo......	18	A good cart-road over a plain, but sandy. Thermometer in shade 96°, in sun 114°, elevation 350 feet.

Total distance, miles 179, computed by period occupied on each march, and from inquiries from villagers. A Burmese mile is equal to two and a half English miles. The entire distance in Burmese miles is seventy-six miles which, at the above computation, would give 190 English miles. The pass across the hills could be easily improved and much shortened. Until the hills are reached there is nothing to obstruct, and if the path over them was kept open, the passage would be available for the dry months every year. There is every thing to indicate the presence of malaria at the base and in crossing the hills. But on the plains the villages swarm with healthy looking children. Each village has from ten to thirty houses.

Advantage of this route over that via Rangoon.

By adopting this route instead of the usual tedious journey by Rangoon, Pegu and Sittang, I saved in time from twenty-five to thirty days. I observed, daily, considerable traffic in grain, bamboos

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and wood all the way from the foot of the hills on each side towards the river and intermediate villages, and with the exception of the tract across the range, I encountered no difficulties. A path across these would much facilitate the journey and materially shorten the distance. For now, except wild elephant tracts, there is nothing in the shape of a path. I would do no more than trace a good line and keep it clear of forest and fallen trees annually; thus to facilitate intercourse between the two frontier posts, which apart from the convenience to the public, as in my own case, would also be less expensive and less destructive to health than the ordinary tedious journey attended with so many discomforts. The route I took was on an average some fifteen miles from the frontier line; on this latter, an annual grant for a bridle path has been made; but this sum has been expended where there is no traffic, on a line twelve miles north from Thayetmyo, and thirty-five from Tonghoo in the plain. I would suggest that the grant allowed for this purpose (now I believe Rupees 40 annually per mile) be transferred to the opening out of a path over the "Zadabeen pass," which no where exceeds 1,700 feet in height. The path might be scarped out of the sides of the hills, leaving a firm soil as a base. Few or no rocks would be encountered, and beneath the surface is sand stone and clay slate, the latter visible on the rising banks of streams. If ordinary precautions be taken to guard against the evil effects of malaria, which doubtless floats about in many spots at all times of the year amongst these hills, I believe this route may be safely traversed for five or six months of the year, viz., from November to June. But once available, the safe periods would soon be determined. Somewhat south of the pass is the source of the Pegu river, a spur of the Yoma represented as "Galadzet" in a map published by Symes, who came to Burmah as Ambassador in 1796.

SECTION III.

STATIONS ON THE SITTANG.

TONGHOO.

SECTION III.

Military force and Medical Establishments in Garrison.

C Company 4th Battalion Artillery.
Assistant Surgeon J. R. Crawford, (Her Majesty's 69th Regiment.)
Assistant Apothecary H. Staggs.

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H, M. 69th Regiment of Foot.
Surgeon H. G. Gordon, M. D.
Assistant Surgeon J. R. Crawford.
Assistant Surgeon J. H. Whittaker.
Do. do. F. Madden.
2nd Apothecary F. Pearl.
Assistant Apothecary J. Wayne.
2nd Dresser Anasthavasagum.

2nd Regiment M. N. I.
Assistant Surgeon B. T. Suffrein.
Do. Apothecary C. L. Brown.
2nd Dresser Appavoo, on other duty.

Detail and Sapper Hospital.
Assistant Surgeon B. T. Suffrein, (2nd Native Infantry.)
2nd Dresser Rhamany.

Jail Hospital.
Surgeon. H. G. Gordon, (H. Ms'. 69th).
Native Doctor, Abdool Kurreem.

Latitude 18° 56′ north.
Longitude 96°, 57′ east.

Average annual rain fall 76 inches.

Thermometrical observations.

Max.	Min.	Mean.
100°	60°	75° of feet.

Elevation above the sea 280 feet.

General Topography of station and vicinity. Meterological observations.

The frontier Civil and Military station on the eastern side of British Burmah occupies an excellent position on the right bank of the Sittang river, on an open undulating elevated plateau of gravel and sand, with a clayey sub-soil. It is distant from Ava about 200 and from the frontier line about thirty-five miles. By the direct line to the sea, the distance is 160, but by the winding route of Sittang it exceeds 260. To the east, north-east and south-east, are the mountains of the red Kareens and other hill tribes. The nearest ranges distant from fifteen to twenty-five miles, possess an altitude reaching to 5,000 feet; but some of the more distant attain an elevation of 7,000 feet above Marine level. The Yoma range lies some forty miles to the west. Tonghoo was first occupied in February 1853. Sanitarily considered the situation of the Cantonment has been judiciously chosen. Running north and south about a mile on the bank of the Sittang, the bed of which does not become exposed, it extends about half a mile inland. It is very much to this prudent selection of the site that this station surpasses Thayetmyo in salubrity. The ground descends in the direction of the native town, the northern and western outskirts of Cantonment. This natural channel for the drainage of the place is full of irregular hollows,

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imperfect drains and objectionable swamps, all of which are receptacles for deleterious deposits. In all new settlements, the improvement of the course of natural drainage should always be the first consideration, the same thing being laid down *by plan*, arrived at by correct levels, to be carried out thereafter from time to time as the means are forthcoming. From the conformation of the ground around Tonghoo, an effectual system of drainage appears unattended with difficulty.

Meteorological Observations at Tonghoo for the year 1860.

Months.	Thermometer in the Shade.			Rain inches.	Remarks.
	Max.	Min.	Mean.		
January ...	86	51	68$\frac{33}{62}$	0·30	Cool and misty.
February ...	94	58	75$\frac{16}{29}$	,,	Do. do.
March ...	101	61	83$\frac{25}{62}$	,,	Warm and close.
April ...	100	65	84$\frac{4}{15}$	13·33*	Do. do. a few thunder storms.
May ...	97	75	84$\frac{9}{62}$	6·53	Do. do. do.
June ...	98	72	80$\frac{29}{30}$	21·99	Do. do. do.
July ...	88	74	79$\frac{22}{31}$	19·62	Clear and close do.
August ...	90	75	80$\frac{11}{31}$	12·01	Do. 13th, 11 A. M., slight shock of an earthquake felt.
September..	89	75	81$\frac{16}{30}$	22·85	Several severe thunder storms.
October ...	94	72	73$\frac{23}{31}$	10·75	Do. Do.
November.	88	68	78$\frac{22}{30}$	3·40	Few thunder storms.
December...	87	55	70$\frac{12}{31}$	,,	
				110·78	* This large fall of rain is unusual at this season.

Detachment 4th Battalion Artillery

The strength of the European Artillery at Tonghoo has just been reduced to ninety men. The barrack and hospital accommodation is ample. On a somewhat raised site of an old pagoda the hospital and out-houses are placed. The buildings are too much crammed together. The male and female wards, the Dispensary, bath-rooms and store-rooms should alone occupy this plateau. The privy arrangements are very bad. The hospital privy is a raised fixed platform over a cess-pool, which is never emptied, only ten yards from the hospital on one side, while on the other side some what further removed is the same odious style of privy, resorted to by the men in health. I only found four sick in hospital. The diseases of the men are not of a grave nature. Two deaths only occurred in the two Companies during the past year, both

from hepatitis. The Lascar hospital occupies the same plateau, and the construction of this privy is of the same objectionable nature.

H. M. 69th Regiment of Foot.

The blocks of buildings occupied by this Regiment are far too close. These consist of a double line in contiguous columns, the distance between each block being twenty-four paces, and between each line of buildings forty-six paces. This latter space is occupied by lavatories; a most objectionable position for them, for the offensive soiled water mingled with the urine of the men, either stagnates or creeps along shallow open drains parallel with the barracks, until it soakes in the earth or evaporates. Thatch and wood alone enter into the construction of these barracks. The danger to life and property, therefore, from their proximity is very great, as has recently been experienced at Thayetmyo. No hospital having yet been constructed for the sick of Her Majesty's European Regiment at Tonghoo, two parallel blocks of barracks are set apart for them. This unavoidable temporary distribution of the sick is objectionable, first, because men afflicted with disease should never be massed with men in health; and second, because from the buildings being so closely crammed together, the most common conveniences required by the sick are denied to them. The privy for them consists of mat screens, connected by a covered passage to these two blocks, in the narrow space between the lines of barracks occupied by the lavatories, and the kitchen is too far removed to give the sick a chance of a comfortable meal.* When the Surgeon desires to separate contagious from non-contagious diseases, convalescents from others suffering from grave maladies, from want of suitable accommodation, he permits the latter to proceed to their barracks, and as regards the former, it is a "make shift" with him in this as in other important matters where the comfort of the sick is concerned. The cook rooms for sick and well are distant between 200 and 300 yards from the barracks, and worse than all, the privies which are immediately beyond the kitchens are all provided with cess-pools which are never emptied; a system opposed to all sanitary laws and found by experience to be so fatal to health and comfort as to be "absolutely prohibited" all over India by a Circular in the Public Works Department, by order of the Supreme Government, dated 30th July 1859, No. 5,149. There is no covered

* Vide sketch, where in it will be seen that one of the men's Lavatories is used as a native hospital for followers, and besides the privy, two wash houses, a dead house and cart shed are also crammed into this narrow space.

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passage between the barracks and the ranges of kitchens and privies, a great want where the sun is so powerful at one season and the rains so heavy at another.

Proposed remedies for the above imperfect arrangements.

To correct this faulty state of matters I would propose, first, that as early as practicable a hospital worthy of the name for the European sick of the garrison be constructed. They are at present provided with more inadequate accommodation than the natives of the force. Second, that advantage be taken of the reduction of the European Garrison from an entire Regiment to a Wing to remove the whole, or a portion of every intermediate alternating barrack in each line, which would give a clear space of about 100 feet between each block, sufficient to erect *pucka* lavatories and kitchens; the latter to be each fitted up with Duff's cooking apparatus, found by experience so useful on the Madras side, and which, as having only one instead of a multitude of fire-places, reduces the risks of conflagration to a minimum. As the entire space would not be required for these two buildings, a portion of the barracks might be left standing for school-room, reading-room, coffee-room, workshops, &c. Third that a system of drainage be laid down from the barracks to the river; and fourth, that privy accommodation be so constructed that it shall have free roof and floor ventilation, that the ordure be daily removed, and that the use of charcoal as a deodorizing agent be put into practice, as laid own in the Circular above referred to. The present privies and cook-rooms are built of wood. The former, as may be supposed, are most offensive to the station at large.

Unsatisfactory state of health of H. M. 69th Regiment of Foot.

36. At the period of my inspection of this Regiment, 22nd April, its strength was 964; its sick in hospital sixty-three; and its average sick for the year, sixty-nine. At Tonghoo the death rate has not averaged 1 per cent. But in the detachment at Shoay Gheen in 1859, there were eighteen deaths out of 140, and in 1860, seven deaths took place out of the same strength. The number of invalids last year have been forty-five. I found fifteen venereal cases in hospital; twenty being the average. The types of the disease are chancres, glandular enlargements, copper colored eruptions, nocturnal pains, &c; infection being almost entirely the result of intercourse with natives of India, who come to Tonghoo in numbers along with syces and other camp followers. Prior to their arrival the disease was rearly seen amongst the Burmese. But there having been no means in force to reduce it, it has now extended, and many females of the country are affected with it. The following table

shows to what extent Her Majesty's 69th Regiment have suffered, from the period of their arrival at the station to the 22nd April 1861.

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Bubo	admitted	38
Gonorrhœa	,,	50
Orchitis	,,	29
Phimosis	,,	1
Strictura urethræ	,,	3
Syphilis primaria	,,	70
Syphilis secundaria	,,	50
Ulcus penis	,,	1

But the prevailing "zymotic diseases" are fevers of a low type, and Surgeon Gordon informed me that not only in this, but in all other ailments amongst the men of his Regiment, the characteristic and prominent symptoms are depression of spirits, excessive debility and anæmia, which resists convalescence generally in every case, and is attended with a long period of debility, demanding nutritious diet, the free use of wine and fermented liquors, quinine and iron, and careful nursing. This was the state of matters with the sick in Her Majesty's 69th Regiment up to the date of my departure from Tonghoo in May last. Surgeon Gordon's report for July is now before me. It exhibits forty-two admissions from fever and bowel disorders, and has the following observations appended thereto. "Owing to the admission of several severe cases of fever of unusually low type, during the month, the consumption of wine has been large." In fact Dr. Gordon found it necessary to administer to sixty-one sick in that month, 14½ dozen Port Wine, 35 dozen malt liquor, and 3½ bottles brandy; and a close scrutiny into the character of disease at Tonghoo, satisfies me, that to withold, or dole out generous stimulants with a sparing hand, would result in loss of service to the state of many, either by death or by invaliding.

The advantages of the free use of stimulants as medicine in certain classes of Diseases.

As the knowledge of the principles of practice of medicine progresses, so the beneficial administration of stimulants, in certain states of the system and in certain classes of disease, becomes more and more apparent. There is now much discussion relative to the costly expenditure in our European Military hospitals of late years, as compared to olden times. Such an antithesis in therapeutics on the part of the modern Surgeon (a practical knowledge acquired during years of close application under Physicians, whose lives are spent in watching disease in all its phases at our extensive hospitals in Europe) is not likely to be sufficiently appreciated by those whose duty it is to consider consumption, unexplained, a

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profuse expenditure. The judicious stimulating treatment of disease, long recognized by our best British and American Physicians, is now also rapidly displacing the "*eau sucrée*" system of the professional body in France; and the therapeutical effects of wine and fermented liquors are daily more and more appreciated by them. A French Physician of repute states from his own experience, that 2lbs of bread and two bottles of wine a day, to a man in health, are more nourishing and enable him to work better than he could do on four pounds of bread and 2 quarts of water. Another regards the administration of wine and spirits in disease, "as aliments as well as Hygienic, assisting and determining the cure of a large number of diseases." And a third asserts, "I do not hesitate in declaring that they are often greater therapeutical resources than opium, quinine and other officinal bodies". This has long been the recognized opinion of our best and most extensive practitioners at home. It is immaterial to enquire whether the aspect of disease is now changed, or whether the beneficial effect of the present system is the result of actual assimilation, or increased nervous energy, so long as we are satisfied that deficiency or relaxation in the propelling power of the heart and capillaries is restored, without which the vital activity of the great organs cannot be sustained, and that the effect is constant and permanent. It behoves us therefore to make ourselves well informed of every instance where the expenditure of stimulants appears excessive, ere we condemn the administrators of them; for a Surgeon in charge of one of Her Majesty's Regiments, has usually had a more than ordinary experience in disease in many quarters of the globe, before the lives of 1,000 men are placed in his sole charge.

Marked result of this stimulating treatment in H. M. 69th Regiment of Foot.

We have in the Regiment under review an excellent illustration of the utility of the system of medical treatment referred to in the last paragraph. A detachment of 140 men of the Corps was stationed at Shoay Gheen during the years 1859 and 1860. In 1859 this detachment had 313 admissions and 90 deaths. In 1860 the admissions were 376 and the deaths 7. The type of disease both seasons being "typhoid remittent." The young Medical Officer in charge during the first year was careful of his stimulants; but under positive orders from the Surgeon of the Regiment, the following year, these were given with no niggard hand. The gratifying result is stated above. We have a still stronger proof of the efficacy of this system of practice under the able Surgeon himself. Although the death rate

among the men is surprisingly low, on the date of my inspection the average daily sick for the year was 69 out of a strength of 964, or about 7 per cent. I was so forcibly struck with the pale, waxy blanched appearance of the countenances and integuments generally of the sick, that I entered fully and frequently on the subject with Dr. Gordon, and learned from him the character of the disease peculiar to his men, and his system of practice, and I am quite satisfied that this satisfactory low death rate is the happy result of the skilful and judicious stimulating plan of treatment pursued by that Officer.

Recommendation to withdraw H. M.'s 69th Regiment from Tonghoo on account of their health.

After mature consideration, a feeling of duty compels me to record here my opinion, that to prolong the residence of Her Majesty's 69th Regiment at Tonghoo, would inflict permanent injury to their health, and as such, add more to the burden of the state by deaths and invalids, than the amount expended on their removal to another station would come to. I have not come to this decision hastily, nor would I unadvisedly urge a measure which would entail considerable expense, for the consideration of Government, did I not consider it a moral obligation to do so. I had the full medical history of the corps before me from the Surgeon. I have already described the appearance of the men on the sick list, and two companies of the healthy men who were paraded for my inspection were little better. The majority of them exhibit that bloodless anæmic appearance, that soft and relaxed muscular tissue, pale lips, tongue, and gums, and that low state of the circulation which is clearly indicative of the advisability of a change of locality. They complained of a want of energy, a feeling of faintness and depression of spirits, and expressed a longing desire "to be taken away from Tonghoo;" and this is hardly to be wondered at, for shortly prior to their embarkation for India, they had returned from a long service in the west Indian climate, and proceeding at once to Burmah, they have during the past 3½ years tasted nothing but Beef and other Commissariat rations. The men now look as if they would speedily succumb to any epidemic disease, or break down on an ordinary march. A residence in a hill climate and good food is what is required to restore them to health and vigour. Physically they are a fine body of men.

2nd Regiment M. N. I.

The strength of the 2nd Regiment Madras Native Infantry, on the 23rd April was 854, and the sick list twenty two. Prevailing diseases syphilis and syphilitic complications, eighty seven cases having occured in eighteen months; and fevers chiefly from the Detachment

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at the lime-kilns. The hospital is situated on the verge of the old fort ditch, to which place, the corps resort for the purpose of nature, under cover of low Jungle. It is also the receptacle for garbage and surface filth, so the stench is most offensive. The hospital is a first rate building, 200 feet by 37, raised five feet, and freely ventilated.

Detachment 2nd Regiment N. I. at Line Kilns.

During two-thirds of the year, lime is prepared for public purposes at a picturesque spot, formed by a gorge of wooded hills, pierced by a crystal stream, descending from the Kareenee mountains. The accommodation for the men is good ; but the position of their huts at the base of these hills, as before observed of such localities is insalubrious. It is fourteen miles from Tonghoo, almost all the severe cases of fever come into hospital from this Detachment.

Detail and Sappers and Miners Hospital.

The strength of the Detachment of the Madras Sapper Corps in April last, was 200, and the Native Public Details numbered 450. The former work at the lime kilns and suffer considerably from the prevailing fever of the locality, during the working season. There were three deaths from fever during the past year. But irrespective of this, both the Sappers and the followers resort to hospital more from venereal than from any other disease.

Jail at Tonghoo.

The Jail if completed accordingly to the plan laid down by Captain Lloyd, Deputy Commissioner, will be a model for the construction of others. The accommodation for the prisoners is freely ventilated, over-crowding alone is to be guarded against. I found 7 per cent. sick from trivial ailments. The privies are constructed on the system of water tight removable boxes running on a tram-way, a system which ought to be introduced into all jails throuhout Burmah, with the addition of the back ventilating roof air shaft employed by Captain Forlong in the Moulmein Jail, with so much advantage and comfort to all. The last thing at night and the first in the morning, all prisoners are marched to the privy, so that they are seldom obliged to add to the impurity of the atmosphere within the cell during the night. Their occupation is chiefly draining and road-making. It ought to be a rule throughout the country, to open out all drains and cut down all fences in the month of May before the rains, and to do the same again in the month of October, as the rains are passing away. I learn that prisoners sentenced up to three years only will be retained at Tonghoo.

Lock Hospital and Civil Dispensary recommended at Tonghoo.

My observations on the destructive progress of syphills at Tonghoo as exemplified in the Military hospitals there, shows that urgent cause exists for the establishment of measures to arrest the disorder. As

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already observed, the large majority of prostitutes who propogate the disorder are females from India. The Burmese population of Tonghoo is rapidly increasing from across the border, and lately, there have been large migrations of Shans. The great want of this luxuriant country is population. The formation of a Dispensary at this frontier station would materially encourage imigration from the native States beyond.

General observations relative to the formation of Sanataria in Burmah.

The duties which engaged me in other parts of India, prevented my arrival in this province until the season was too far advanced to admit of my personally inspecting the elevated ranges within, or adjoining the British possessions. But careful inquiry amongst all those who have visited these localities satisfies me, that the period has not yet arrived when Government could direct the exploration of these with an encouraging assurance of turning them to good account. Doubtless there are several localities, which hold out favorable prospects of becoming at some future period admirable places of resort for colonists and invalids. But for many years to come the scanty population in the intermediate low country and on these elevated ranges, precludes all prospect of the necessary supplies being obtained either *en route* to, or on the places selected; so that, to quote an observation of Colonel Phayre, Commissioner and Government Agent of Pegu," it would only be sinking "gold to no purpose even to attempt for the present to render these "otherwise desirable positions more accessible." In this opinion Colonel Fytche, Commissioner of Martaban and Tenasserim Provinces, concurs. He observes, " the inaccessibility of these Hill ranges, through " the want of roads, and the distance and heavy jungle that has to be " traversed before they could be reached, precludes their being used under " existing circumstances as sanitaria." Our already well-tried mountain sanitaria in India must, therefore, be the place of resort for European invalids, whose health will benefit by a removal thither. The attention of Government must be directed to the improvement of the means of communication from the frontier military posts to the sea, and to the establishment of a coast, or Island, sanitarium in a convenient locality for the reception of those who labor under ailments, which could be benefited by a sojourn there. Under these circumstances, I will not dwell further on the mountains in Burmah, and their interesting Kareen inhabitants, more especially as I purpose to enter in detail on this subject, as stated in the preamble, in a separate report.

Measures necessary to improve the present water communication to the coast.

In order to improve the means of communication between this frontier post and the sea, the main point is to reduce the present tortuous

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water communication, either by opening channels in the numerous narrow head-lands formed by the river Sittang, or by deepening and throwing water into other more direct channels, which are dry or nearly so at certain seasons. Having travelled over the country at the end of the hot and beginning of the rainy season, making inquiry as I proceeded, I believe that a water route which would reduce the present distance from Tonghoo to Rangoon and Moulmein by nearly one-half, is quite practicable at a cost comparatively small, as compared to the expense of constructing and keeping up a road, where floods are so common and vegetation so luxuriant; and further, that the expense of the formation of this route would be speedily repaid by increase of traffic, and the reduction in annual outlay to Government in the transmission of troops and stores; and I may add, in the saving of much suffering, if not life, to the invalid. But as relates to cost, commercial advantages, &c., there are others better qualified than I am to speak, and also to furnish such data, as will prove that the undertaking is not of that formidable character which a casual observer might suppose.

SECTION IV.

Shoay Gheen.

SECTION IV.
Shoay Gheen.
Topographical features and Sanitary condition.
Pegu Sapper Battalion.

During our early occupation of Burmah, Shoay Gheen on the left bank of the river was always a Military post of importance, as the head-quarters of the Younzaleen, a district lying between the Sittang and Salween, two great rivers having the same course as the Irrawaddi. The features of this country are much diversified; there being rich well watered valleys, elevated table-land and mountains of considerable eminence. Much of the high land is clothed with pine forests, and at an elevation of 3,000 feet has a climate and temperature equal to what we find in Southern India at double that height. Hereafter this will be perhaps the possession most prized by the colonist. But as yet the population is scanty and no madie,and has been much interfered with by predatory tribes. The town runs along the face of the river about two miles, extending inland some half a mile, and has been well laid out in spacious streets with good side-drainage. The Shoay Gheen river flows from the mountains to the east of the town. The signification of this word is "river of gold," and washings in the sands of the stream give to the labourer an average of one Rupee worth of the pure metal per diem, in the form of dust, and

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occasionally imbedded in quartz. The space cleared for the Cantonment is on an elevated plane, on hard gravelly soil, with exellent water from wells. As stated above, the mortality in the Detachment of Europeans serving at this place has been considerable. Fever was the prevailing disease, and so it still continues in the Pegu Sapper Battalion, the head-quarters of which were the only troops at the station at the period of my visit. They too have since been removed to Moulmein, leaving only a Detachment of Corps at Shoay Gheen. There is a small Jail and Civil Dispensary at Shoay Gheen.

Necessity for the permanent appointment of Civil Surgeon at Shoay Gheen.

The approaching removal of the Military Garrison will not, it is to be hoped, result in the withdrawal of the Surgeon from this station. As the head-quarters of the Civil establishment of an extensive district, apart from the local requirements of the place itself, consisting of the Deputy Commissioner and his family, Europeans, Indo Britons and Natives attached to the Civil, Forests and Telegraph Departments, Prisoners and an established public Dispensary for the relief of the community, Shoay Gheen is an excellent central spot, mid-way between the sea and the frontier station of Tonghoo, for a resident Medical Officer to afford aid to all parties ascending and descending the river Sittang.

Detachments of the Pegu Sappers at Sittang Kyikete and Beeling.

The direct route to Moulmein starts from the town of Sittang an extensive and prosperous looking place, on the right bank of the river of the same name, in the neighbourhood of which European and Native troops were until recently located and retained good health. The site of the Cantonment is well chosen on the high bank of the river. Now it is held by a detachment of the Pegu Sapper Corps, also shortly to be withdrawn. Fifteen miles from Sittang is the village of Kyiketo, and twenty-one miles beyond is Beeling, at both of which places are detachments of the same Corps. Twelve miles beyond Beeling is a place called Kyouktsareet, from whence I was able to proceed by boat seventy-nine miles to Moulmein, although no rain had fallen for about eight months ; the first part of my journey was by waggon. But during the rains the entire distance can be accomplished by water, the tidal influence being very distinct at a distanee of sixty miles from the sea.

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SECTION V.

MOULMEIN.

Military Force and Medical Establishments.

32nd Regiment M. N. I.
Assistant Surgeon J. T. I. Doyle.
Asst. Apothy. J. Macdiarmid.
2nd Dresser Coopoosawmy.

Jail.

Assistant Surgeon G. Marr, M.D.
Sub-Asst. Surgeon T. Good,

General Hospital.

Assistant Surgeon G. Marr, M.D.
Assistant Apothecarry A. D'Roza.

Latitude 16° 3' North.
Longitude 97° 38' East.

Average annual rain-fall 190 inches.

Thermometrical Observations.

Max.	Min	Mean.
100	69	80

Elevation above the sea 36 ft.

General Topography and descriptive Sketch of country around.

The provinces of which the city of Moulmein is the capital, were ceded to the British in 1826. The boundaries have never been accurately defined, but are laid down as extending from Latitude 10° to Latitude 17° North, and from Longitude 97° 30' to Longitude 99° East, forming a narrow strip of territory about 420 miles in length and from 50 to 70 in breadth. The characteristic feature of the country, particularly in the northern part, is that of alluvial plains, either open and of great extent, or partly embraced by high mountain ranges and intersected by numerous ravines and rivers of considerable magnitude. To the north, the "Salween" has a course of nearly 1,000 miles penetrating beyond the confines of China; the Attaran and the Gyne, though of more limited extent, have greater depth; their windings pursuing a course more East than the Salween, pass between solitary, or chains of, limestone rocks, which ascend in mural walls, some as high as 2,000 feet and terminate in singular picturesque looking peaks. These three rivers uniting opposite the town of Moulmein form the Martaban river which disembogues into the sea twenty-eight miles below Moulmein to which town it is navigable for large ships. During the wet season the low land everywhere becomes flooded. In the province of Amherst alone upwards of 3,000 square miles are inundated and fertilized, producing on the most gigantic scale, every species of tropical vegetation.

Want of conservancy in the town of Moulmein and covered public bazaars.

The town of Moulmein is peculiarly favorably situated to command the most perfect drainage, both by its elevated position and the diurnal ebb and flow of tide, which exceeds eighteen feet. But a

system of conservancy is wanting to remove the surface filth. The impure state of the public bazaars almost everywhere, those in Rangoon and in Moulmein especially, require special remark ; cart loads of refuse and foul garbage lay heaped up beneath the floors, or around the buildings and the drainage is usually unworthy of the name, being utterly inapplicable for the purpose. The buildings are usually low roofed, miserably lighted and ventilated, and as masses of people daily congregate there, I would urge as a *sanitary necessity*, that whether these buildings be Government or private property, a fixed establishment, under superintendence, be attached to each for conservancy purposes ; and wherever necessary, more *roof* light and *roof* ventilation be provided. The simple expedient for the introduction of light from the roof, which I observed adopted throughout Java, was the introduction to the extent desired of glass tiles of the same mould as the S. tile in use throughout that Island ; the same plan might be applied to large buildings like covered bazaars in this country. In their present very repulsive state, they are liable to become a nidus for the generation and dissemination of disease. Large profits are derived from these bazaars, so they can afford to pay for cleansing establishments.

32nd Regiment M. N. I.

The 32nd Regiment Madras Native Infantry, had completed a service of sixteen months in Moulmein when I inspected them. Out of an average strength of 640, a total of 1,579 had been received into hospital during the twelve months preceding my arrival ; of these there were 242 fever cases and two deaths, 312 bowel disorders and nine deaths, 184 rheumatism, and 118 venereal affections. The number now under treatment is thirty-seven. The barracks for the men and the hospital accommodation at this place are admirable. All the arrangements in hospital were such as to reflect credit on the Assistant Surgeon in charge. The 32nd Regiment is about to embark for India, and the Pegu Sapper Battalion will then garrison Moulmein. The occupation of the Military Cantonment by a Regiment having only two European Officers attached to it, will result in the rapid growth of jungle in the vacated compounds, &c., and it is to be feared unfavorably affect the salubrity of the station.

Jail and system of convict discip'ine at Moulmein.

In this great transmarine Convict establishment on the 30th May last I found 1,220 prisoners from the three presidencies, and 285 local ; the number of sick being ninety-eight. During the year with an average strength as above there were 1,692 admissions into hospital and seventy-eight deaths ; the large majority of diseases and deaths being the result of bowel

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disorders and debility from phagedenic ulceration on the extremities. Prisoners from Northern India appear to possess more physical stamina than men from the coast, and although the occupation and diet of both is precisely alike, the latter are the greater sufferers from disease. I cannot too highly extol the whole of the sanitary arrangements in this Jail, which does much credit to the Officers in charge of the establishment. The convict discipline is the same as that described as in force at Singaproe.

General Hospital.

The General Hospital at Moulmein is a very valuable establishment supported in part by private contributions, and in part by a grant from Government, for the reception of all non-military classes, of whom, with the exception of paupers, all pay at varying rates. During the past year 377 Europeans and 594 natives were treated as in-patients, and the list as per margin will show at a glance the usefulness of the institution, and how much it is appreciated by all classes. Of the entire admissions fully one-third were from syphilitic affections. No where in the provinces is a Lock Hospital more necessary than in this great sea port.

List of out-door patients treated at the Moulmein General Hospital for the year ending 30th April 1861.

	Nos.
Europeans... ..	960
Indo Britons... ..	744
Portuguese...	251
Burmese... ..	1,174
Chinese.. ...	412
Mahomedans.. ...	583
Hindoos.. ...	617
Jews... ..	149
All other classes.. ..	880
Total..	5,770

Martaban. Topographical position.

On the right bank of the Salween opposite to Moulmein is the town of Martaban ; before the last war a place of considerable importance as the head-quarters of the district of the same name. It proved very unhealthy to the troops who garrisoned it for some time after it fell into our hands. Now an Assistant Commissioner alone resides there, and he and his establishment receive medical aid when necessary from Moulmein. The position of Martaban is remarkable for the variety and picturesque beauty of its views, as observed on a clear day from the high ground around the native town.

SECTION VI.

AMHERST AS A CONTINENTAL AND CALAGOUK OR CURLEW ISLAND AS AN INSULAR SANATARIUM FOR EUROPEAN INVALIDS.

General observations on the peculiar adaptation of the above localities for the purposes indicated

Amherst bears a high reputation as a salubrious locality, and has long been a favorite place of resort by residents at Moulmein and other places. Placed at the mouth of the Martaban river, it possesses a high and dry surface of a lateritious formation, a purity of atmosphere, so long as the sea breeze is maintained, and an equable temperature; the mean range throughout the year being 78° and the extremes 56° and 86°, and the average annual fall of rain 142 inches. I have held communication with many residents on the spot, and others who have derived benefit from a sojourn here, and have no hesitation in asserting, that as a *sea coast sanitarium* it surpasses every other position which I have explored on *the continent* of India. In "Amherst" therefore, along with the "*Island Sanitarium*" which I propose should be established at "Calagouk or Curlew Island," (*vide* the reports on this subject) as a means of interchange for the sick, or as a depôt for convalescents generally, the requirements of Government on this score may now be fully realized. For while at "Amherst" we have the alternating land and sea breezes, on "Curlew Island" the pure marine atmosphere at bay Point (*vide* "Eye sketch") is constantly renewed by currents wafted from all parts of the horizon, brought about the peculiar formation of the south end of the Island, a circumstance which it is probable will operate favorably to promote its salubrity. Dr. Barlow a respected old uncovenanted Medical Officer has had charge of the Jail and station of Amherst for two years. The jail is occupied by infirms (204) from the Moulmein Jail. During his experience he knows of no specific disease amongst the community, and 1st Dresser Harris, who has been resident at the place for sixteen years, corroborates this. Cholera only once during that period made its appearance in the native town in 1846, having been introduced by H. M. Steam Vessel "Cambrian."

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SECTION VII.

TAVOY.

Latitude 14° 50' North.
Longitude 98° East.
Average annual rain fall 175 inches.
Thermometrical observations.
Max. 93°, Min. 69°, Mean 80°
Elevation above the sea 20 to 50 feet.

Topographical sketch of the town and country around.

The Capital of the District of Tavoy occupies a position on the left bank of the river of the same name, about 30 miles from the sea and 150 from Moulmein, on a rich alluvial valley, bounded on the west, at a distance of some three miles, by a range of precipitous and densely wooded hills from 200 to 800 feet in height, extending along the course of the river to its embouchure where they are broken into numerous islets, and on the east by another chain of hills of similar elevation, above which, towers in the distance a more lofty range which intersects the Peninsula in a longitudinal direction. The country in the vicinity is less densely wooded than in the Northern provinces, the jungle is generally in patches of low shrubs and small trees, and in many parts there are extensive open tracts entirely under grass. The climate is considered more salubrious, and the temperature more equable than at any other station in British Burmah. Vesicular iron-stone, or laterite, having powerful magnetic property is found in the vicinity of Tavoy.

Superior conservancy arrangements enforced within the town.

I was much pleased with all that came under my observation at this picturesque locality in conservancy arrangements. Major Stevenson, the Deputy Commissioner has the extensive and populous town in as perfect a sanitary state as it is possible to be. The streets are free from all town refuse. The drainage is open and well planned to carry off all sewage to the river, and the arrangements for cleanliness enforced in the great bazaar are deserving of every commendation. All this too he has had carried out by the people themselves, by means of *moral force.* The result of this well planned conservancy is an immunity from "Zymotic disease" and an increasing healthy looking rising population.

Anxiety evinced by the community to have a Civil Surgeon posted to Tavoy.
Civil Dispensary and Jail.

An impression having prevailed amongst the town people that on the withdrawal of the Military Detachment no Surgeon would be continued at the station, advantage was taken of my official visit, to represent to me through the Deputy Commissioner the calamitous results such a measure would inflict on them. They represented that for many years the Government had conferred on them the benefit of European

Medical skill, and that people from all parts of the district resorted to the town to profit by his advice and treatment, and they quoted instances where life was saved by the timely relief received. They further stated, "that they have been consulting together about drawing up a petition to "Government to let the Surgeon remain, and to offer to contribute to "their utmost to pay for English medicines in order that their prayer "may be more acceptable"; from 60 to 70 is the daily average of sick treated at the Dispensary, and a careful examination of the records satisfies me, that none but a skilful well educated Medical man would be able to do justice to the general class of patients who seek relief. Moreover, although the regular Military details are withdrawn, they will be re-placed by Irregulars or Police. A large body of Government servants are also attached to the Deputy Commissioner, and the Jail contains 300 prisoners, the number to be increased to 500 when the new jail, now under construction, is completed. Under all these circumstances, it is my duty to urge for favorable consideration that a Civil Surgeon be permanently posted to Tavoy.

SERIES X. Section VII.

SECTION VIII.

Mergui.

Latitude 12° 20° north.
Longitude 98° 30° east.
Average annual rain fall 180 inches.
Thermometrical Observatsons.
Max. 93,° Min. 63,° Mean 78°
On the beach, 10 to 20 feet above sea.

Section VIII.

Topographical description of Town and country around. Medical Establishments.

The station of Mergui is also remarkable for its salubrity. It lies on the coast 250 miles from Moulmein, and 100 from Tavoy south. It's sea front is about a mile in length on the right bank of one of the embouchures of the great Tenasserim, the town in fact occupying a site on one of the numerous islands forming the delta of the river. The greater part of the year it has all the benefits of a fine sea-breeze, and although open to the south-west monsoon, it is screened from its violence by clusters of islands, which enter into the eastern Archipelago; but more immediately by the small island of Putto (which is separated from the town by a branch of the river) possessing an elevation of 800 feet. The surface undulates from the sea face, and is diversified by low hills densely wooded to the summit. There is more humidity of the atmosphere at this than at any other station in Burmah, and like the British posses-

SERIES X.
SECTION VIII.

sions in the Straits of Malacca, the rain-fall is spread over the greater part of the year. Mangosteen and other fine fruits peculiar to the former localities, are found at Mergui in equal richness and abundance.

Jail, Civil Dispensary, Military details, Town conservancy and its results. Civil Surgeon recommended.

The Regular Military Detachment was, at the period of my visit, about being replaced by one from the Local Sapper Battalion. In the Jail there were 318 prisoners and 14 sick. I brought some pressing sanitary wants relating to the Jail, to the notice of the local authorities. The Civil Dispensary is an establishment of much value to the native community, composed of Burmese, Chinese, Kareens, Shans and a large number from India. Much of the town lies low, it is swampy and difficult to drain, and there is at times considerable sickness. The large average of 18¼ per cent. of the population of the town resorted last year to the Dispensary for medical aid. There is little or no increase of population in this town, and many of the living children denote from their appearance that they will never attain maturity, nor can matters improve until coercive measures rouse the people from that natural apathy which permits garbage to heap up and rot beneath their dwellings, rank vegetation, stagnant water and swamps, to surround them, and drains constructed by Government Officers for their health and comfort, to be choked up, it would almost appear purposely, with the sweepings of their houses. The substantive appointment of the Medical Officer at this station is, as at Tavoy, " in charge of Military Details," and as pressing a necessity exists for the retention of his services here as at the latter place. On the occasion of my visit the community were in trepidation, lest he should be removed. The appointment of Civil Surgeon to both these places should be made permanent.

SECTION IX.

BASSEIN.

Latitude 16°46° north.

Longitude 9045° east.

SECTION IX.

Position and Topography wretched Town drainage and evil results of imperfect scavenging of Towns.

Bassein is the extreme south-west of the British possessions in Burmah, and the head-quarters of the Civil establishment in the District. It occupies a favorable position on the left bank of the first direct off-shoot from the Irrawaddi to the sea. The upper portion of the banks of this, the Bassein channel, are low and covered with elephant

grass. But as it approaches the town of Bassein, they become more defined, rising considerably above the highest floods and covered with beautiful flowering shrubs and forest trees. The District is second to that of Rangoon, in magnitude, and like it embraces a great extent of rich Delta land, easy communication with the sea and anchorage in 10 fathoms opposite to the town which is 70 miles from the sea. The site occupied by the civil lines is well elevated above the river, but it falls off on every side to little above highwater mark, which makes drainage difficult. The native town is on this low land, its natural drainage being towards two streams which flow from the east into the great river, at the north and south ends of the town. But there is here also a lamentable want of conservancy. To my observations on this point, I am met every where with the same reply, viz., the want of means to carry out what every one acknowledges to be so desirable. At all stations where prisoners are maintained, a certain number should be allotted for the special duty of removing town surface filth, and keeping open surface drainage, and it ought to be the duty of a paid servant of Government, European or Indo Briton, to direct the work, reporting to his local superiors at stated periods what has been accomplished by them. This need not cost much money, and the purity, or contamination of the atmosphere in positions where human beings are massed, is almost solely influenced by a healthy system of conservancy, or the absence of it, as the removal, or retention of all that gives rise to mephitic emanations, chiefly swamps and the products of organic or vegetable remains, it will be readily admitted that a simple measure, such as the above, must contribute in some degree to the sustenation of health, and the prevention, amelioration, or arrest of disease.

Jail at Bassein, cause of large death rate generally in Jails, proposed new Jail.

The mortality in the jail at Bassein usually ranges high. The average number of prisoners incarcerated during the past five years has been 350. I found 299 with 12 sick in hospital; 12 per cent. deaths had taken place during the past year; but the mortality has been as high as 22 per cent. to strength. My inquiries convince me that it was mainly to overcrowding in this and other jails within these Provinces, that the large death ratio is attributable. If the food the prisoners receive be wholesome, and their out-door occupation be not more than that of an ordinary day's labour to a hired cooly, and they be provided with that amount of cubic space to sleep in, which is necessary to health if not to life, and there be no noxious vapours from privies, urinals or swamps around their dwellings, then it will soon be found that the usual assigned

SERIES X, SECTION IX.

causes of mortality, such as "depression of mind," "nature of occupation," &c." will no longer require to be quoted. In the jail at Bassein which is decidedly the very worst in the Province, there is not wholesome accommodation for much above one-half of the prisoners now there. It being in contemplation to remove to the central jail at Rangoon all prisoners sentenced to above three years, I would suggest, that instead of proceeding with the construction of the great wall now 4 feet high, proposed to encircle the new jail at this place and which embraces an area of some fifteen acres, the habitations for the prisoners be improved and the circle of the wall be reduced in proportion to the number of prisoners likely to be incarcerated here.

Want of a Civil Dispensary much felt. Proposition to form one for the benefit of the community and the large Karreen Christian Mission Schools.

No Dispensary for the reception or for the out-door treatment of sick exists at this shipping port and populous city. To the wretched Jail hospital, all of the community who desire relief, resort, and side by side with the malefactor in irons, when compelled by sickness; there is no other alternative than the jail for them. At the period of my visit an unfortunate European with remittent fever was there, and this, Dr. Davis, who is most zealous and indefatigable in his attendance on the poor within the town and elsewhere, informed me, is by no means an uncommon occurrence. Let me recommend that the pucka building lately used as a hospital for the Military Detachment, be handed over to Dr. Davis as a Dispensary. It is in close proximity to the Jail hospital, which is nothing more than a mat-shed closed in. I would remove to this building all the valuable Government property, such as Medical stores, Surgical instruments, &c. Any medicines which may be required by the prisoners may be taken to them from there, and the jail subordinate Bengal Medical Establishment would, for the present, do for both hospitals. A respectable place would thus be available for the unfortunate sick of any class. Those who have the means to do so, would of course keep themselves while in hospital, and a small cost for feeding sick paupers, would be the sole expense incurred. Bassein is the centre of a populous agricultural Kareen population; the head-quarters of one of the most prosperous of those indefatigable American Missionary Establishments, countenanced and in part supported by Government, which are silently but surely working out the great end of Him, who has placed this interesting people under British rule: Establishments, which are always crowded with the male and female youth of a rising intelligent Christian Native population. Cholera and other grave "zymotic diseases" are seldom absent from the native town. I would earnestly bespeak the influence

of the authorities to establish, first, a healthy system of conservancy at this place; and second, to introduce the means of securing relief to those who are afflicted with disease. With so much apathy amongst the population and so many demands on the community as there now are, I was informed by the Deputy Commissioner, that a subscription list to support a Charitable Dispensary would not at this time meet with support. As in our older possessions in India, and in the Tenasserim Provinces therefore, I would not look for aid from this source. Hereafter when the community learn to appreciate Medical advice they will doubtless contribute here, as we find has been done elsewhere.

SECTION X.

Rangoon.

Latitude 16° 45' north.

Longitude 96° 15' east.

Average annual rain fall, 90 to 100 inches.

Thermometrical Observations.

Max.	Min.	Mean.
100	58	79

SECTION X.

Position and population of the city of Rangoon.

The capital of British Burmah occupies a position on the left bank of the Rangoon river which is the chief effluent of the great Irrawaddi into the sea. Its banks are low and muddy, and the country through which it passes, flat, swampy, or covered with dense jungle or long rank grass. The soil around is clay and sand intermingled, the surface being diversified by several gentle elevations of a lateritious character. The town is situated twenty-four miles from the mouth and on the left bank of the river. Three years after it became British property, or in 1855, its population numbered about 46,000. Three years afterwards in 1858, it appears to have exceeded 60,000 giving an increase of 14,000. But a careful census taken last year of the town and suburbs of Rangoon, showed a population of 55,884 only, being 4,000 under the latter, and about 10,000 above the former of the other two periods quoted. The area of the Rangoon District is 9,800 square miles, being greater by 900 square miles than that of Bassein.

SERIES X.
SECTION X.
Position of Cantonments and Barracks for Europeans.

The wonderful sanitary condition of the European community, Military and Civil, from the first year of our occupation till now, is sufficient proof that the site of the cantonment has been remarkably well chosen. It occupies a spacious open space north and west of the town, on gentle rising ground removed about a mile from the river; the surface still ascending to the north towards Kemmendine, and to the south embracing the lofty terrace on which the great Shoay Dagon pagoda stands, on the descending spurs of which the barracks for the European portion of the force have been very judiciously placed. These consist of spacious well elevated apartments, built of teak, and raised on posts, so as to be beyond the influence of damp, and freely ventilated by means of a lower board near the flooring, which moves on hinges and a free space between the top of the wall and slope of the ceiling. The present thatch roof is about to be re-placed by shingles.

Climate of Rangoon and Burmah generally.

The climate of Rangoon especially, and indeed of Burmah generally, is decidedly more salubrious than the majority of stations on the opposite coast. From the month of November to the end of February, although never decidedly cold, there is a genial invigorating feeling in the atmosphere; sea-breezes temper the excessive solar heat of March and April, at all places within 100 miles of the coast, and although hot winds do occasionally prevail at the two extreme frontier Military stations, the nights are cool every where throughout the year. From the middle of May to the end of October it rains, but never so continuously, that fair intervals do not occur morning and evening, so that there are few days that out-door exercise cannot be taken. The following table exhibits the average mean temperature at Rangoon for the years 1858, 1859 and 1860.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual temperature, average three years.
74	75$\frac{2}{3}$	77$\frac{1}{6}$	82$\frac{1}{2}$	81$\frac{1}{6}$	80	82	80$\frac{1}{2}$	81$\frac{2}{3}$	82	78$\frac{1}{3}$	75	79$\frac{1}{6}$

City of Rangoon, plan of construction, and difficulties to surmount.

The city of Rangoon occupies the site of the old Burmese town—Dallah being immediately opposite to it. According to the original plan, the ground set apart for the future capital of Burmah, has a river frontage of 3,900 yards, or nearly two miles and a quarter, with

an average depth of 700 yards. It is divided into squares of 800 × 800 feet, and by streets 100 feet wide, intersecting each other at right angles; each square again being sub-divided into five blocks, by streets of fifty and thirty feet in width. By this plan, therefore, when the sites are fully occupied, there will be twenty-five squares, giving 4,300 lots. Those who see the town in its present state, can have but a very imperfect idea of the difficulties that have been encountered to make it what it is. Formerly the whole of the western part was under high water mark, being always inundated at spring tides, and on the eastern side was an extensive morass, generating malaria and fœtid odours from the filth of which it was the general receptacle. On the suburbs also, to the south and east for about two miles, and to the village of Puzoondoung, on the banks of a creek, the entire space was a low impassable swamp; the village being then reached by a circuitous foot path, half a mile of which was a wooden pathway.

Various plans formed to overcome these difficulties.

The first great work constructed, was to run an embankment along the river face of the town, forming now the strand road, having sluice drains at intervals to bar the influx of high tides, and to admit of the escape of surface drainage at low water. A causeway, six feet high, and fifty feet wide, was also carried across the swamp to Puzoondoung. Partly with the view to procure material for the construction of the roads, and partly in order to form a waterway through the centre of the town, which could be emptied at low and filled at high tides, and from its central position not only drain the city, but also carry off its sewage, a canal was commenced, which was to communicate with the river at the upper and lower sides of the town. This important work was subsequently abandoned in consequence of an unfortunate impression getting abroad that the water introduced into this canal would poison all the wells on its own level, and empty all on the ground above this; from the circumstance, as was then argued, that the slope of the surface ground was in the direction of the canal. I cannot think that there need be any cause of alarm on this score. The surface slope of a country cannot be relied on as a criterion that the strata beneath run the same course, more especially, on land where the sedimentary deposits were precipitated, as is probable all over this Delta, after inundations, in angular or horizontal beds, varying in their positions and particles. This I observe is also the opinion of Captains Williams and Trevor, the two gentlemen now engaged in an inquiry into the best system of surface drainage for the city.

SERIES X.
SECTION X.
Plan for draining the city approved, that of forming Tanks objected to.

It is unnecessary to recapitulate the impurities of this city from the entire absence of any conservancy system, the correction of which engages the most anxious thoughts of the local authorities. But having paid some attention to matters relating to the health of towns, and perused the official correspondence on this subject, I may be permitted to state, that I quite agree with those who advocate surface drainage only, as applicable for the city and suburbs of Rangoon, and that even to secure this, it will be necessary to raise the ground within the town. But I would earnestly guard the local authorities against giving ready sanction to the other part of the proposed plan, *viz*., the construction of a series of deep tanks along the course of the old canal, to receive the drainage from the Cantonment, and the sewage from a town, having a population approximating to 60,000 souls. This would even be worse than to revert to the barbarous state of matters in which we found the city in 1852, for the vegetable and animal substances that would accumulate in these tanks, would be certain during the dry and hot season to render the water putrid, or cause it to evaporate, thus exposing its pestilential bed. Far better to carry out the original intention of communicating the canal with the river to the north and south; or if the means to accomplish this great work be not at hand, open up a passage with the south end only, so as to admit of an ebb and flow of the tide, which, as it has a rise and fall of from sixteen to twenty feet, when admitted into, and receives egress from the channel, would be pretty sure to render it wholesome and sweet. There is no reason why the same happy absence of disease and death which exists amongst the Europeans in cantonment should not exist in the town also. But before this satisfactory end can be obtained, the sanitary physician must be combined with the Engineer, as has been done at Prome.

A Company, 2nd Bat. Artillery.

The average state of health of our European soldiers in Rangoon will challenge comparison with that of our most favored stations in India. My own inquiries on this subject are corroborated by the statistics of Surgeon-Major Ranking, wherein he shows, that in a period of three years, 1,020 European Artillery were treated in hospital out of an average strength of 1,000, and that the death rate amongst these did not exceed 16·20. The strength of the Artillery on the date of my visit was 117 Europeans and fifteen native Gun Lascars. The hospital and all relating to it was in admirable order. There were only five sick from trivial causes.

SERIES —. SECTION X. Detail Hospital.

The Detail hospital has always had a large number of native sick, detached from Regiments up-country for transfer to India. The native force has now been reduced from twelve to four Regiments, so the sick are also much reduced. The hospital is an excellent building, and is admirably arranged, and deficient in nothing. I will revert to the subject of transfer of sick from Burmah to the opposite coast under a separate head.

H. M. 68th Regiment of Foot.

The position occupied by the barracks of Her Majesty's 68th Regiment has been already described. The Corps arrived at Rangoon in March 1858. The following table exhibits the strength, invaliding and deaths from that date up to the 1st September 1861.

1858.			1859.			1860.			1861.		
Average strength.	Invalided.	Died.	Average strength.	Invalided.	Died.	Average strength.	Invalided.	Died.	Average strength.	Invalided.	Died.
961	29	12	1,243	71	25	1,174	37	10	1,102	45	6

As regards the mortality up to 31st December 1860, seven were accidental, which leaves thirty-nine from disease; twenty-eight of these took place during the first sixteen months, or between March 1858 and July 1859, leaving only eleven from the latter period till the date of this report. In 1861, two deaths occurred at Thayetmyo, two at Poonamallee, one at Meaday, and one at Tonghoo. At Rangoon there has been no death for close on fourteen months. The average daily sick during the past year has been

At Rangoon out of a strength of		769¾	sick	40·85
,, Thayetmyo	do.	296½	,,	22·96
,, Meaday...	do.	74½	,,	2·78
,, Poonamallee	do.	33¼	,,	not ascertained.

Mr. Best, the able and zealous Surgeon of the Regiment, observes, "that "each succeeding year since the arrival of the Regiment has been charac-"terized by a marked diminution in the frequency and severity of fevers "and dysentery, which were the most grave class of diseases amongst the

SERIES X. SECTION X.

"men during the first eighteen months of their residence in Burmah." He is also of opinion that disease in Rangoon is chiefly of a sub-acute character, and that the climate is too relaxing, especially during the rains, for convalescents. This he has particularly observed in dysentery; often when there is every prospect of a return to a healthy and normal state, from no perceptible cause a relapse takes place. An immediate change is then the only chance for the sick man. Thus many valuable lives have been saved by prompt invaliding. There have been no less than 197 admissions from venereal disease during the past year; the large majority being syphilitic ulcerations with glandular complication, cutaneous eruptions, or superficial ulcerations of the throat. There were thirty-seven sick in hospital on the morning of my inspection—none of them of a serious character.

Hospital buildings for H. M's 68th Regiment objections noted; improvements suggested.

The accommodation for the sick consists of two long wards, each capable of comfortably accommodating fifty sick; an eye ward for twelve; and a female ward for twelve. All three well enough ventilated, but constructed of wood planking and thatch roof, and consequently particularly dangerous from fire. The privy attached to the eye ward is the only one in the range still retaining the objectionable cess-pool arrangement. There is a lavatory and cook-room attached to each end of the large wards, and a ward erected for Insane about the centre of the space. The lavatory is cutcha work, wood and thatch, too close to the hospital. The kitchens are pucka, miserable contracted buildings with several fire places, dangerous from their proximity to the hospital, and without the means of preparing a comfortable meal for the sick. As for the Insane ward, no medical man would be guilty of giving his consent to the incarceration of an unfortunate Insane European in that building. I would therefore recommend, first, to remove the present hospital lavatories *in toto*; second, to convert the present two pucka cook-rooms into lavatories, third, to convert the present mad house into a kitchen, fitted up with Duff's cooking apparatus. All those who know the value of the latter in diminishing expense in fuel, in the preparation of comfortable meals for sick, and in the reduction of risk of conflagration, an important consideration, in the midst of such inflammable material as enters into the large majority of our public buildings in this country, will at once recognize the advisability of the substitution of these appliances, which have only one fire place, to prepare what a dozen under the old system would be required to effect. In addition to these changes, the gutter to carry off

the drainage around the hospital should be made pucka. The lumber, doolies, &c., which are placed beneath the more elevated of the two large hospital wards should be removed, so that the said space might be used by the convalescents to walk about or amuse themselves in, as is done in the barracks.

State of the Regimental Guard room H. M's 68th Regiment.

The area of the Regimental Guard room is thirty-three feet by twenty-seven; during the day it accommodates a guard of eighteen, and at night one of twenty-eight men, with an average of six prisoners night and day, affording some 750 cubic feet of air per diem, and 500 at night to its inmates. To secure health to an European adult within the tropics he should have about double the above; the purity of the atmosphere is in this ease further deteriorated by a line of solitary eells under the same roof, which are utterly devoid of light and ventilation and quite unfitted for the inearceration of Europeans or Natives. An unoecupied pucka built range of solitary eells adjoins this building. Even in its present state it is superior to that just described. But it would be much improved if the roof were elevated a couple of feet by the construction of a sky light its entire length. It is in contemplation to roof the barracks of the men at this place and at Tonghoo with shingles. Let me recommend the introduction of fixed sky lights into the roofs. Light eonduces to health as well as comfort, and these barracks are wanting in this respect.

Towelling, soap, sheeting, waste paper.

I have often had cause to remark on the poor description of towelling and sheeting in use in our European hospitals. I again bring the subject forward. Cloth of a more substantial quality would be a saving to the State, as well as a comfort to the sick. Now that the armies are amalgamated the rules which regulate the Purveyor's establishment in every other hospital at home and in the Colonies, should be made applieable to European troops in India. A most perfect Code has recently been promulgated on this subjeet, drawn up by order of Parliament, in which are laid down the quantities of every article to be provided for the eomfort of the sick; soap and waste paper, in themselves two very essential articles in all sick rooms, not being omitted. Waste paper is as necessary to eleanliness as towelling, and so it is considered in all well ordered hospitals at home. Our Medical Code is obsolete. It is in many respeets far behind the present advanced order of things and in this respect is an obstruction, instead of a guide. Her Majesty's Hospital and Purveyor's regulations should be made applieable to Her army in India as it is all over Her Colonies, as well as Great Britain. I think

SERIES X. Section X.

it would be better also to relieve the Army Commissariat from the duty of purveying for hospitals, and introduce the system in force at home.

Means of recreation. Soldiers' Garden.

The men of Her Majesty's 68th Regiment have not acquired the usual indolent habits of India, but spend much of their leisure time in the cantonment garden. Soldiers' gardens are now of such deep interest to all, that a few particulars relating to that at this place may be acceptable. The Rangoon Cantonment gardens were originally instituted by the late Marquis of Dalhousie. After several failures, Major Harris, Deputy Assistant Commissary General, at the request of Brigadier Russell, Her Majesty's 84th Regiment, took them under his management. He was enjoined to keep in view these objects:—

1st. To afford the means of raising vegetables for issue to the European troops.

2nd. To give the men an opportnnity of amusing themselves with gardening.

3rd. To afford a place of agreeable resort for the soldiers, in common with the rest of the European community. As regards the 1st object, during the first year 1857-58, 4,730 lbs. of vegetables were raised.

In 1858-59, 11,478 lbs. In 1859-60, 21,582 lbs.

In 1860-61, 17,586 lbs. and all were issued as part of the ration to European troops in garrison.

In 1858-59 only 20 men cultivated ground, and sold to the Commissariat for issue to the troops 2,861 lbs. In the following year 50 men took plots of ground and sold for the troops 12,896 lbs. and in 1861, 120 men had become cultivators and sold 14,671 lbs. To Major Harris therefore is chiefly due the credit of all the arrangements and progress of this garden. Besides working in the garden the men engage much at their different trades, both Regimentally and for Officers of the Cantonment. I have not seen any where a Regiment wherein the means of recreation and rational engagements are better provided. Every thing shows that the Officers identify themselves in every possible way with the men, encouraging and taking part with them in their amusements and games. The reading-room, coffee-room, and school-room is well attended. It is quite a pleasure to see how each is engaged in his own pursuit, and doubtless to all this rational employment and satisfactory internal discipline may in part be attributed the happy state of health which the Regiment has enjoyed. As at the frontier stations however, a ration of

mutton or preserved meat, or perhaps fresh pork, occasionally to the men, would be much relished. The sick alone have that indulgence now.

Coffee Rooms and Canteens in European Regiments should be provided with French wines also.

I have said that the coffee-room in Her Majesty's 68th Regiment is much resorted to. Here, besides coffee, sardines, tins of biscuit and other articles are retailed at a moderate rate, and a room adjoining, fitted up with seats and benches, is provided with draught board and other means of recreation for the men. There are many who advocate the breaking up of the Canteen system in Regiments. I cannot concur with them. I believe that a moderate quantity of stimulants to the European is as conducive to health to the robust, as it is to the sick and convalescent, and that the former, if deprived of the means at hand of procuring what nature, or want of self-control prompts him to partake of innocuously, he will resort to localities where compounds, deleterious to his constitution, are found. By G. O. C. C., dated Umbala, 20th March 1853, 3 quarts of porter, equivalent to 4 bottles, or 2 quarts of porter and 1 dram of spirits, or 1 quart of porter and 2 drams of spirits, are fixed as the maximum allowance for each European soldier.

Now this allowance cannot certainly be taken with any chance of sobriety, especially by a young recruit. It is without doubt destructive to the health of all, and in a moral point of view, highly injurious. A retired old soldier, now a respected settler on one of our Hill ranges, informed me that on his arrival at Madras, thirty-five years ago, in company with a large party of recruits like himself, a dram of arrack was forced on him on the beach, "to keep away Cholera." He had never tasted spirits at home and had declined it on the voyage. From the beach the party went into the Fort when another dram was served out prior to their march to Poonamallee, a few hours thereafter, and mid-way the party had another dram; parched with thirst they broke off and drank ditch or any water they could find, and on arrival at their journey's end a fourth dram was served out, on which they retired for the night without food, save the biscuts they took with them from ship board. We live in more enlightened days now, wholesome stimulants, as coffee and malt liquor, have displaced in a great measure the use of ardent spirits, and it is by providing the men with the *means* within reach, that this has been effected. To this end the G. O. above quoted should be re-considered, the maximums indicated therein should at once bo reduced, and generous Bordeaux light wine should be gradually substituted for the ardent spirits now too prodigally sanctioned by that authority.

SERIES X. Section X. Indian and English regulations for messing soldiers on ship board, considered and contrasted.

In January 1860, a party of forty-five recruits were on board the ship "Lousiana" with me bound for this port. There being no porter provided for their use, a dram of arrack, upwards of three ounces by measure, was served to each man before meals at 7 A.M., and again at noon. Boys of seventeen, some of whom had not tasted ardent spirits before they become soilders, are thus taught to become confirmed dram drinkers. Some who did not drink their allowance sold it to their comrades, at ten pice or two annas, or an I. O. U. to receive double that sum on the issue of pay. While others not content to drink their allowance raw, add to it chillies, ginger, &c., to make it more ardent. Dr. Best of Her Majesty's 68th Regiment, who was a fellow passenger with me, came from England in charge of these very recuits. A pint of porter was then served out to each man after dinner. It was optional with him to take it and drink it on the spot, or decline it and receive credit in his account for beer money. Need I observe how much more preferable this plan is to our pernicious system. Those who have served on board-ship with European soldiers and sailors in Her Majesty's and the late Honorable East India Company's Armies, are aware of the difference in food issued to each. Now that both armies are united, were there no other reason that the messing should be as nearly as possible assimilated, the very union of the forces will, I presume, render this measure necessary.

Articles provided for European Troops embarking in England and in India.

The following articles are provided at the owner's expense in all ships conveying troops from England to India.

A sufficient number of standing berths, or bunks as bed places for women and children and sick.

A Bay for the sick.

Water closets for sick, and women.

One of Fyffe's patent hermetically sealed water closets.

Racks for Arms.

Proper tables and strong seats fore and aft in the side amid ships with cants on the deck.

Tubular ventilators.

A lightning conductor.

A Fire Engine.

A suitable prison or lock up place.

Two Life boats fitted up with Clifford's apparatus for lowering them.

Two of Dank's patent rotatary ventilators, and two of Redpath's with hoses. SERIES X. SECTION X.

The whole of the provisions, stores, racks, water closet, sick bay seats, &c., subject to strict examination by an Officer deputed, or Committee of Officers, who report on the ship's tonnage, number of persons she can accommodate, extent assigned for the men in health and position and extent of sick bay; means of ventilation, &c., also that latrines and urinals are provided on the upper deck for 5 per cent. of the men accommodated.

The following two scales represent the victualling of troops from England to India, the third scale is that, I believe now in use, when troops are transported on board-ship in India.

For a mess of six men per week to be served daily, English rate.

Beef for two days		12 lbs.	Ground pepper for seven days	1¼ oz.
Flour	do.	5 ,,	Mustard	¼ lb.
Suet	do.	1 ,,	Biscuit	30 lbs.
Preserved meat, daily,		4½ ,,	Salt butter	1½ lb.
Mixed vegetables, do.		1 oz.	Tea	1 lb.
Rice,	do.	3 lbs.	Sugar crushed	9 lbs.
Pork for three days		18 ,,	Vinegar	3 pts.
Pease		6 pts.	London Porter	42 ,,
Preserved potatoes,		2 lbs. 4 oz.	Pickles	2½ ,,
Flour for one day		5 lbs.	Lime juice	21 oz.
Suet	do.	¾ ,,		
Plums	do.	1 lb. 11 oz.		

Daily Meals.

Breakfast—biscuit, tea and sugar.

Dinner as per above.

Supper—biscuit, tea and sugar.

Quantities for each man, English rate.

	Beef.	Flour.	Suet.	Plums.	Pork.	Pease.	Preserved meat.	Rice.	Compressed mixed vegetables.	Biscuits.	Salt butter.	Porter.	Water.	Preserved Potatoes, uncooked.	Sugar.	Tea.	Vinegar	Mustard.	Potatoes.	Pickles.	Pepper ground.	Salt.	Lime juice.
	oz.	oz.	oz.	oz.	oz.	pts.	lbs.	oz.	lbs.	lbs.	zo.	pts.	pts.	oz.	lbs.	lbs.	lbs.	lbs.					
Sunday	16	$6\frac{3}{4}$	$1\frac{1}{3}$	...	...	...	...	...	...	5 lbs. per man per week.	4 oz. per man per week.	1	7	...	$1\frac{1}{2}$ lb. per man per week.	1 lb. for a mess of 6 per week.	3 pints for a mess of 6 per week.	$\frac{1}{4}$ lb. for a mess of 6 per week.	†2 lbs. for each man per day.	$2\frac{1}{2}$ pints for a mess of 6 per week.	$1\frac{1}{2}$ oz. for a mess of 6 per week.	2 oz. per day when fresh or preserved meat is given.	$\frac{1}{2}$ oz. Lime juice mixed with 1 oz. of Sugar and 4 oz. water.
Monday	...	...	...	...	16	...	...	...	...			1	7	2									
Tuesday	...	$13\frac{1}{3}$	2	$4\frac{1}{2}$	...	...	...	...	...			1	7	...									
Wednesday	...	...	...	...	16	...	...	...	...			1	7	2									
Thursday	16	$6\frac{2}{3}$	$1\frac{1}{3}$	...	...	...	...	...	...			1	7	...									
Friday	...	...	...	...	...	...	$\frac{3}{4}$	$\frac{1}{2}$	1			1	7	2									
Saturday	...	...	...	...	16	...	...	...	...			1	7	...*									

* Whenever procurable in lieu of flour and suet pease or rice.

† To cover wasteage 5 per cent. on the total quantity to be shipped.

Women receive the same ration as the men with the exception of Porter ½ only allowed to them. Children receive half ration.

Ration to European Troops on boardship in India. For one Adult European, man or woman, two Children equal to one grown person. G. O. C. 31st December 1851.

	Biscuits.	Rice.	Flour.	Raisins or Suet.	Pease or Dholl.	Sugar.	Tea.	Pepper.	Vinegar.	Mustard seeds.	Beef.	Pork.	Firewood.	Water.
	lbs.	lbs.	lbs.	oz.	pts.	oz.	oz.			oz.	lbs.	lbs.	lbs.	gals.
Sunday......	1	$\frac{1}{2}$	$\frac{1}{4}$	1	...	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$	Half a pint a week.	$\frac{2}{7}$	$\frac{2}{3}$	...	3	1
Monday......	1	$\frac{1}{2}$	$\frac{1}{4}$	1	...	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{7}{1}$		$\frac{2}{7}$	$\frac{1}{2}$	...	3	1
Tuesday......	1	$\frac{1}{2}$	...	...	$\frac{1}{2}$	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$		$\frac{2}{7}$	...	$\frac{2}{3}$	3	1
Wednesday......	1	$\frac{1}{2}$	$\frac{1}{4}$	1	...	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$		$\frac{2}{7}$	$\frac{2}{3}$	...	3	1
Thursday......	1	$\frac{1}{2}$	...	1	$\frac{1}{2}$	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$		$\frac{2}{7}$	...	$\frac{2}{3}$	3	1
Friday......	1	$\frac{1}{2}$	$\frac{1}{4}$	1	...	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$		$\frac{2}{7}$	$\frac{1}{2}$	...	3	1
Saturday......	1	$\frac{1}{2}$	...	...	$\frac{1}{2}$	$1\frac{5}{7}$	$\frac{2}{7}$	$\frac{1}{7}$		$\frac{2}{7}$	...	$\frac{2}{3}$	3	1
Total......	7	$3\frac{1}{2}$	1	4	$1\frac{1}{2}$	12	2	1	$\frac{1}{2}$	2	$2\frac{1}{3}$	2	21	7

" Women receive the same ration as men, and children half the ration with the exception of arrack which is not allowed to either.

N. B.—Lime juice 25 quarts for every 100 men for one month or $\frac{1}{4}$ oz. per man per day.

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I am not quite certain that the items in the two first tables are exactly correct, or that the G. O. G., in the third is that now in force. But the general principle is sufficiently laid down to enable the authorities to consider the subject and call for further information.

Opinion of Major Harris, Deputy Commissary General, on the above subject.

I always make it my duty, before offering an opinion on any question of importance, like that now under review, to place myself in communication with the best informed parties on the spot, in order to weigh their sentiments, with that, which by observation I have myself arrived at. In the present case all who know Major Harris will allow, that no one in Burmah, or perhaps in India, is more capable of giving advice on this subject, both from his long experience in the country, and the large number of men, women and children for whom he has had to make provision on boardship. I make no apology therefore for introducing here an extract of a demi-official letter to me relating to it.

"I conceive rations shipped for European women and children on " board-ship require revising. At present the scale laid down for them, is " the same as for a soldier, only half quantity for a child. Now in an ordi- " nary run of seven or eight days, it is presumed the prudent mother takes " some little stores of delicacies in her basket, so that she and her children " come to no great harm with the salt rations and biscuit and boiled rice, " &c., But when it comes to a run of some twelve or fourteen days, her " private stock fails, and I should say nursing women and children must " suffer considerably on salt rations. I have never hesitated correcting this " by shipping preserved provisions to the extent that in my judgment may " be advisable. But as this is not sanctioned by Government, the cost " is all retrenched by the Auditor. On a recent occasion, although I did " ship two days' preserved provisions, the Doctor in charge complained " that sufficient fresh provisions were not shipped for the women and " children. But where is the authority to ship any ? This subject ' should be laid fully before Government, definite instructions should be "issued, as to the description and quantity of provisions to be shipped " for women and children, and for voyages which may last above a certain " time. Now, I will just suppose a case ; fifty women and twenty-five " children under five years' of age, ten at the breast, are shipped at " Rangoon for Madras in the sailing Transport " Sesostris." They may get " across in fifteen days, but are just as likely to be forty, and may be

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"sixty (*Vide* last year's experience). According to existing regulations, I "shipped sixty days salt meat, biscuits, &c., for the unhappy infants. "If they do take sixty days to reach Madras, I take it, they would be but a scurvy lot on arrival. Now in precisely a similar case to the above, I "shipped a few soups, &c., the children, thank goodness, landed safely. "But the Auditor retrenches every pice of the value of the soups and "calls them "*costly articles.*" Now this should not be. Government "should sanction by code, a sufficient liberal scale of eatable, digestible "and nourishing articles for troops, men, women and children on ship "board; and King's preserved potatoe should form a part of such ration "regularly, for it is not safe to send even men to sea on the scale of "rations now sanctioned, if the voyage has a chance of extending beyond "ten or twelve days." Sound sentiments like these from a man of such experience of Major Harris must have their weight with Government in introducing a change in the rationing of Europeans on board ship.

Establishment of permanent measures for the transfer of sick from this coast.

All Medical Military Officers who have served in Burmah can testify to the suffering which both European and Native sick have from time to time endured, from the impossibility of being able to leave that coast at a period when health, lost in that country, could yet be restored by a timely change to the opposite coast. On this subject I cannot do better than again quote from a demi-official communication from Major Harris, who advocates that a properly appointed ship be at the disposal of the local executive, in order at all times to have the means of giving these sick and infirm servants of the State, a reasonable chance of regaining lost health, or prolonging their lives. "I still consider that the force even "in its present reduced state, needs the service of a hospital ship, fitted up "with every appliance for the comfort and well being of the sick. None "of the steamers at present employed are capable of accommodating sick "soldiers without intense suffering; the only vessel fit to receive such "miserable wretched objects as we send away, many of them Europeans, is "a vessel so arranged, that the very moment a sick man is hoisted on board, "he should be conducted to a comfortable berth or hammock, with a "Medical Officer at hand to administer to his relief. Perhaps medicine is "necessary, the Apothecary of the ship should be there. A bowl of conjee "with a glass of Portwine in it is required, then the materials for that "conjee, the cook to prepare it, and the man to serve it should also be in "readiness. In fact, the sick man should find all his trouble cease, and

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"receive all the aid which can be afforded the moment he gets on board "This is the only fair treatment of a sick man, for you cannot send him "on board as you would a man in health. To do this, you must have a "roomy vessel like the "Coromandel" properly fitted, with her own hammocks "her own medicines, her own medical comforts, her own cooks, fire places, "saucepans, &c., all under the control of her own Doctor. The Surgeon of "the Regiment should see the sick on board, the Surgeon of the ship receive "charge of them at the gangway. As matters now stand, we will suppose "some seventy or eighty sick are put on board with probably the most "humane and active Medical Officer in the world to take charge of them. "He has to look after his own embarkation, his kit and his cabin, and he "no sooner gets on board than he is besieged by Commissariat Officer, "Conicopolies, &c., scores of receipts are placed before him for signature, "for fowls said to have been supplied, but which of course he has not counted, "for bread that is coming, for wines, arrowroot, &c., which have been handed "to his Apothecary, if he be fortunate enough to have one. But on "examining these papers, he says, what no bed pans, and at least twenty men "with dysentery on board; off flies the Commissariat Officer and presently "re-appears with some circular pewter contrivances, scratches them down "in the receipts, and at last gets the Doctor to sign them. The Surgeon "now goes down the hold to look after his sick, and finds the whole space "taken up by strong healthy fellows, with heaps of non-descript bundles, "&c., who being able to take care of themselves, naturally get the pick of "places from those who are helpless. By dint of persuasion or abuse, he "clears the decks and gets the sick down. He now finds a cup of sago, "a necessity for some, so he orders the Apothecary to get it ready; the "Apothecary goes for the cook (shipped by the Commissariat), and finds "him hopelessly drunk, the sago has perhaps gone down the hold with the "Apothecary's baggage, or if found, there is no saucepan to boil it, or "if there be a saucepan there is no fire to cook it. It is very clear, "therefore, that the man must go without the sago, on which perhaps "his life depends. Now here are seventy such cases, or even 100 or 150 "in one vessel; before even preliminary inquiry can be made into their "cases, the vessel is off the Lightship, pitches, rolls, and the Doctor, "Apothecary, cook, ward coolies and mahters, helpless from sea sickness, "are enduring too much suffering themselves, to be able to alleviate those "of the sick creatures below. Nothing of this kind would happen in a well "organized hospital ship, carrying her own Surgeon, medicines, medical "comforts, and appliances; much saving would be effected in stores also, as "much is now shipped that is never used. The life of a fowl for instance

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"is very precarious on board-ship, when he is shipped by the Commissariat "with no one to care for him and hundreds anxious to eat him; now in a "hospital ship this fowl would be ship's property and well looked after, and "the Surgeon of the ship would in ten minutes have the means of convert-"ing him into life saving broth, made by a nautical cook who would not "be sea-sick or drunk. Immense misery would be saved if one of the "Government steamers were thus fitted up and placed on the line perma-"nently, and this could be done at a cost no greater than that the Government "now pay for these wretched little screws, the "Higginson" and "Coringa." No arguments of mine can add weight to this graphic delineation drawn from life. The necessity of change in the transport of sick is apparent.

Statement by Major O'Connell, Assistant Quarter Master General, of the sick sent from Pegu during the past 5 years.

I now introduce a demi-official communication from the Assistant Quarter-Master General of the Division, from which the authorities will be enabled to judge of the sick transport requirements for the Army in Burmah. "I send the memorandum you called for, regarding the "number of sick that have been sent away from this Division. I have no "reliable data before August 1857, so the calculations commence from that "date. The per centage calculation for each separate year is liable to be "affected by circumstances which do not apply to other years; for instance, "the per centage of European sick sent away in 1858 is very low, because "the strength of European Force consisted chiefly of the 68th and 69th, "which had arrived in that year direct from England and sent very few "sick away at first. The per centage of Native sick is high in 1857, "because in that year nine Regiments of Native Infantry arrived in the "Division, and it is always the case with Native Regiments, that during the "first year in Burmah the largest number are sent away sick. In 1859 "the percentage is high, because a number of sick that ought to have been "sent away in the latter end of 1858, were detained here for want of "transport and did not get away till March 1859, a number that ought to "be in the account for 1858, are thus brought into that for 1859. For "these reasons, the per centage given at the end, and calculated on the "whole period, is the best average and the safest to work on."

Wives of European soldiers should be allowed change of air in sickness when judged necessary.

I am aware that the extension of the privilege of change of air to wives of European soldiers in Burmah, on the recommendation of Dr. Best, is now under the consideration of the authorities. As advocated by him, the wives of soldiers who are obliged to serve with their husbands in all climates, would receive it as no small boon, were the State to consider favorably the proposition by the Surgeon of Her Majesty's 68th Regiment

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that when advisable to remove them to a Hill station to regain their health their husbands be permitted to accompany them and remain with them doing duty at the Depôt; cases of this sort would be comparatively rare; but they occasionally occur. Surgeon Best informs me that three women have died in hospital at Rangoon since he assumed charge of the Regiment, who, had he the power, would have been sent to the Hills with every prospect of benefit. It would be manifestly useless to extend the benefit to infirm patients, with perhaps children, without their natural protectors to accompany them.

42nd Regiment M. N. I.

The 42nd Regiment Native Infantry has only been in Burmah one year, and it is now about to be withdrawn, consequent on the reduction of the Force. Its strength is close on 1,000, and its sick list on the morning of my inspection was fifty-three. The prevailing diseases during the past year have been fevers, bowel disorders and cutaneous affections, and the mortality thirteen. The state of the hospital and all appertaining thereto is highly creditable.

52nd Regiment M. N. I.

I found forty-seven sick in the 52nd Regiment Madras Native Infantry stationed at Rangoon, since May last year, and the same classes of disease prevalent in the 42nd Native Infantry, most frequent with them also, save venereal affections which have been very much more frequent in the 52nd Regiment. There have been nine deaths during the past year. Both this hospital and the 42nd are admirable, well-raised and freely ventilated buildings.

General observations on the sick of the Native soldiers in Burmah.

That service in Burmah has always been prejudicial to the health of the Madras sepoy, is in no small degree the fault of the sepoy himself. In my report on the Native soldiers garrisoning the stations in the Straits of Malacca, I recorded the result of my inquiries as to the causes of the large amount of sickness and invaliding there. After full inquiry, I have no hesitation in asserting that the same causes are in full operation here also. The aim of every sepoy is to make as much money as he can out of the bountiful rations provided him by Government. It is known to all, that not only do messes and families receive their ghee from the lines of their Regiments, but that it is also sold in the bazaar, or burnt as oil or exchanged for oil. So long as the sepoy can save money by, or receive a ready sale and a good price for this article, he disposes of it as I have said. So thus disappears the only thing in the shape of animal food which he receives. The ration of ghee is 2 oz.; if it were half the

quantity, the sepoy would prize it more and perhaps consume it all himself, as it would be too little to sell. His 2 lbs. of rice is more than a man can eat as a daily meal, and as for tobacco, it is downright waste and injurious also, to give any one man 1 oz. and 4 drs. for his daily consumption. The whole subject of rationing for sepoys over the water, ought to be considered. I would rather see the system of rationing abolished *in toto*, and let sepoys procure food when not on active service, as our servants and other natives of India (who stand the climate as well as Europeans) do; the Commissariat having also a small store to supply the wants of the men *on payment*, when the market cannot do so. Under the present system (for the establishment of cooks and diets to native sick has not yet been introduced into hospitals) a sick man's rations accumulates while he is on the sick list; which gives him an additional inducement to starve or feign home-sickness; again, so long as he has rations from Government, he does not trouble himself to search for that variety of diet which every large bazaar in Burmah *now* offers, and which is more genial to the stomach and more necessary also to the healthy nutrition of the body, than his present daily unaltered ration. The very exertion to procure this food would do him good. But if this plan does not meet with approval, then I would alter the present ration, and make it more varied. Spirits in moderation not only directly aids disgestion, but also diminishes the amount of matter given off by the lungs and kidneys, and thus with other means arrests the wasting of the solid tissues so frequently observed amongst sepoys, without any positive or tangible disease; the result partly of not sufficiently varied diet, and a humid and relaxing climate. As a substitute for this stimulant or prophylactic, to the introduction of which there are many objections, we have coffee, which possesses in a remarkable degree the power of resisting fatigue and sustaining nervous energy. To most of our sepoys who have gone through a service in any part of the Mysore Division, coffee has become an article of daily food, and to the majority of others it is probably an unobjectionable beverage. In addition to being directly nutritious, coffee as a stimulant, by acting on a languid circulation, gives bodily refreshment, and all experience is in its favor as a valuable dietetic. Believing that it would be found a beneficial adjunct to the Sepoys rations on foreign service, I drew up the subjoined scale of rations in substitution of the present, and submitted it to Major Harris for his views, which are as follows:— "Enclosed is a "statement showing cost of present and your proposed scale of ration. I "have written over and over again against the tobacco ration; it is very

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"expensive; far more so than the compensation allowed; a very difficult "stock to keep up and to transport; is but partially used and frequently "sold by the sepoy. You will find the reduction of the ration of ghee will be "very much opposed by the sepoy: one pound, eight ounces of rice is quite "as much as a sepoy wants to eat as a rule. Europeans get coffee; the "68th every other day, the Artillery twice a week; it is quite a matter of "taste how often they draw it in lieu of tea."

Present scale for one Native.

		RS.	A.	P.	Cents.
Rice.......	2 lbs. @ 3-12 per 164 lbs...	...	...	8	78
Dholl.........	3 oz. @ 8-2 per do.	...	...	1	79
Salt..........	12 drs. @ 4 Pice per lb.......	...	...	...	19
Ghee.........	2 oz. @ 39 Rs. per 100 lbs.	...	...	9	36
Tobacco.....	1 oz. 4 drs. @ 65 Rs. per 365 lbs.........................	...	...	2	67
Turmeric...	2 drs. @ 1 Anna, 1 Pie per lb.	...	...	...	10
	Total for 1 day......	...	1	10	·89

Proposed Scale.

		RS.	A.	P.	Cents.
Rice ...	1 lb. 8 oz. @ 3-12 per 164 lbs....	...	...	6	58
Dholl	3 oz. @ 8-2 per do.	...	...	1	79
Salt ...	12 drams @ 4 Pice per lb.	...	...	...	19
Ghee ...	1 oz. 4 drs. @ 39 Rs. per 100 lbs.	...	...	5	85
Tobacco.	1 oz. @ 65 Rs. per 365 lbs	...	...	2	13
Turmeric.	2 drs. @ 1 Anna, 1 Pie per lb... ...	...	...	...	10
Coffee ...	1 oz. @ 4-3 per lb	...	...	3	19
Sugar ...	1 oz. @ 3 Annas per lb.	...	...	2	25
	Total for 1 day... ...	1	10		·8

	RS.	A.	P.	Cents.
For 365 days—Present scale.........	43	8	2	85
„ 365 „ Proposed scale......	41	15	7	20
Difference per man per year...	1	8	7	65

There is a slight gain on the proposed new ration which if handed over to the man in cash would be an additional inducement for him to take it in substitution of the present one, if it be decided to leave it optional with him to take which he pleases; of the two the proposed scale is undoubtedly that most likely to keep him in health.

Cantonments liable to become overgrown with jungle consequent on the reduction of the Force.

We have reason to fear that the reduction of the Military Force at this and at all our other Military Garrisons, will result in the rapid growth of jungle in the many deserted officers, compounds, and abandoned hutting localities, and unfavorably affect their salubrity. Vegetation is so luxuriant in Burmah, that already overgrown hedge rows, &c., impede the free percolation of air. The general plan on which the once extensive cantonment of Rangoon was laid out, is sanitarily considered, excellent. To this and to the judicious arrangements enforced to keep down jungle, to remove surface filth and decaying vegetation, and by preserving a system of thorough surface drainage, prevent the formation of morass, &c., may be attributed the gradual amelioration of disease from the period of its occupation by British troops, until it can now vie in this respect with our best hill sanataria in India. To preserve its sanitary reputation in its present altered state, when rank vegetation in the course of one season makes such rapid progress, is a subject which now engages the earnest consideration of Major General Carthew, Commanding the Division.

General introduction of Latrines recommended.

The local Civil authorities should be moved to construct latrines for the use of the inhabitants in towns contiguous to Military Garrisons, and *as public buildings*, these should be considered indispensable necessaries in all cantonments, for non-combatants as well as combatants ; the present system of resorting to every bush or other covering for the purposes of nature being visited with punishment.

Rangoon Jail buildings Prisoners, &c.

The Jail and jail hospital at Rangoon are situated to the north-east of the town about three quarter of a mile from the river. A wall of twenty-two feet high encloses an area of fifteen acres. The prisons consist of two long ranges of substantial wooden buildings divided for the purpose of classification into separate wards ; a portion of one range is used for a hospital, and solitary cells, built of brick, occupy a separate space. This is the only jail of a permanent structure within the Province, and hereafter it will be the place of confinement

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for all prisoners from the other districts (except the two frontier ones) whose sentences exceed any period beyond three years. All life prisoners are to be deported to the Andaman Islands. As the accommodation will have to be considerably extended in order to accommodate the large expected increase of prisoners, I recommend that a new hospital be erected in the vacant space between the debtor's jail now in course of construction, the female prisoners being also removed from such close proximity to the men; the present hospital and female ward will then be available for the male prisoners. There are now (2nd September) 853 prisoners in the jail, including 77 sick, Lepers, Incurables and Insane, and twenty females, from which it will be observed, that all do not enjoy 500 cubic feet of space which is the smallest amount consistent with health, which a laboring man should have. Amongst these are several infirms from age or disease, besides a proportion of jail establishment as Peons, who receive treatment along with the prisoners, in the jail hospital. The prisoners are employed on Public and Municipal works. Good water is procurable from five wells within the walls. The solitary cells are utterly unfit for the incarceration of human beings, not being provided with the means for the admission of fresh air from below and escape of the foul atmosphere above. The Lepers now alone occupy them. The privy accommodation also is far inferior to that excellent system introduced by Captain Forlong into the jail at Moulmein, which contains fully a third more prisoners than that now under review. I cannot say too much in praise of the sanitary arrangements in force in the latter establishment.

Lunatic Asylum and refuge for Lepers and infirm.

Prior to the Mutiny in India an asylum for Lunatics was commenced at Moulmein. When the work was stopped, the walls were sufficiently high to receive the roof ; so soon as circumstances admit of the completion of this very essential structure, it ought to be the refuge for all prisoners infirm from age or disease, Lepers and Insane, from the entire Province of British Burmah; and perhaps also for all females sentenced to imprisonment for periods exceeding one year. The separation of this class of prisoners from those equal to hard labour, would be of incalculable advantage in every point of view to the latter, and to the former would bring curative measures to bear with much better effect than can be applied under the present arrangement of massing all together indiscriminately in one or more buildings.

General Hospital recommended in substitution of the present charitable Dispensary.

A Charitable Dispensary was established in the town of Rangoon in 1856 by voluntary subscription, the Government contributing the building, medicines and medical attendance, the extent of subscriptions for its support being then Rupees 150 per mensem. In the following year it was closed owing to the failure of voluntary contributions. The city after this date appears to have been without the means of affording medical relief to the diseased and destitute until last year when the Dispensary was re-opened, and still retains a languishing existence, the private contributions, its sole support, amounting only to Rupees 75 per mensem, while the cost of the *fixed* establishment alone is Rupees 55 for the same period. In the Commissioner's administrative report for 1855-56, he states that " sanction has been given for the " erection of a General Hospital," and again in 1857-58, he observes," In " a large port like Rangoon the want of a General Hospital and Dispen- " sary is much felt. Foreign sailors are frequently left on shore destitute " and diseased *** the erection of the General Hospital sanctioned by " Government has under existing circumstances been postponed." I need hardly say that I recognize with him the great necessity for the early establishment of this institution for the relief of unfortunate sick seamen who resort to this port, and in the midst of a city containing a native population of close on 56,000 souls, with the existing causes of disease teeming around them. The present Dispensary is a very poor place, and cannot be recognised as a hospital for sick, it being ill arranged and utterly wanting in conveniences. This establishment has had to contend against difficulties which seldom fall to the lot of similar institutions. Formerly it has been customary for our liberal Government to undertake the entire responsibility of establishing and supporting charitable Dispensaries in all places where such were deemed necessary. Now the custom is, the community subscribe a certain sum when they desire the construction of such an establishment, before Government adopt it as their own. In the present case the very existence of this Dispensary appears to have been dependent on uncertain private contributions; moreover, from avoidable causes, since it re-opened in April 1860, the native subordinate, the very life of such an establishment, although worse than useless in his place, still could not be re-placed by a better man, until very recently, when on the arrival of the present medical subordinate, the community again became inspired with confidence and now resort to it freely. On the 1st instant, I found three European sick and thirteen natives as In-patients, (some of the latter being bed ridden) and

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this is fully as many as the place can receive; on the same day twenty-five Out-patients applied for relief. In the margin are the admissions for the month of July, from which it will be observed that all classes of the community are represented. I have gone into the subject of the Dispensary at some length, because some have attributed its partial failure to other than the true cause. A full examination into all relating to it satisfies me that no want of zeal or interest in the prosperity of the institution can be attributed to the Medical Officer, who gives his gratuitous professional services daily at a convenient hour, and prescribes personally for the sick. The native Dresser lives on the premises; he bears a high reputation, and will attend to all emergent cases during the day. When circumstances admit of it, the construction of a General Hospital, equal to the wants of the inhabitants and creditable to this important capital, should be proceeded with.

Europeans	7
East Indians	3
Africans	1
Arabs	2
Bengalees	17
Burmese	4
Coringees	4
Madrasees	6
Malays	3
Mussalmans	5
Native Christians	2
Total	54

Lock Hospitals recommended at all large stations in Burmah.

Inseparably associated with other important plans for the preservation of the health of the soldier and for the increase of a vigorous and sound population, is the introduction of measures for the amelioration of syphilis; a disease more disastrous in some respects than the Cholera, or small pox pestilence. For although the two latter *sweep* away their numerous victims, those who recover have not constitutions polluted with a destructive poison, which so many who have had syphilis carry with them to their graves; too often contaminating with their loathsome disease those whom they approach, and transmitting a canker to their progeny. Venereal disease I learn was not known in Burmah until after our conquest of the country, and ever now the great mass of prostitutes are natives from India. Few Burmese females come before us for treatment, save in the very advanced stage of the disease. But to judge from the great destruction *of parts* amongst these, and the male population who seek for relief, the disease must make great havock amongst them. Except on the Malabar Coast I have not observed a worse description of the disease amongst our European soldiers. Having gone into the subject in more than one place in this report I will only here urge the formation of Lock Hospitals at all towns in Burmah resorted to by Europeans. Few Military posts can be compared in importance to the two Frontier Brigades in this Division. Their sanitary requirements with a view to retain the garrison as effect-

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tive as possible, demand more than ordinary care; and Government will not, I am sure, withold from them the means found serviceable elsewhere in materially reducing the non-effectives from remediable causes. A Lock hospital although sanctioned for Rangoon has not yet been formed.

Vaccinators and Registrars of births and deaths recommended for Burmah.

It is generally allowed that one great cause of the non-increase in the population in these provinces, to an extent such as one ought to expect, judging from the swarms of children found in every village, is the destruction of the population from small pox. My inquiries during the five months occupied on my tour, satisfy me that the opinion is founded on fact. In almost all his administrative reports, the Commissioner deplores the little success that has hitherto attended all the earnest endeavours of the Civil Surgeons to extend the blessings of vaccination generally amongst the rising generation. The chief difficulty appears to be the introduction of good vaccine lymph, which is usually transmitted on plates of glass, or in crusts excluded from the atmosphere by means of Bees' wax, &c. That inoculation may be successful when sound virus is obtainable, we have full evidence in the success which occasionally attends its introduction; as at Tonghoo last year under Surgeon Gordon, "where 73 per cent. of those vaccinated, took the disease well;" at Prome the year previously under Assistant Surgeon Corrie; in 1859 by Assistant Surgeon Dickinson "from a child vaccinated in "Calcutta and brought to Rangoon," and in the previous year by the same Officer who "vaccinated with success nearly 100, when the *vesicle* "suddenly ceased to be re-produced, the climate except for a very small "portion of the year appears to be altogether inimical to the success of "vaccination." Lymph is much more safely transmitted in hermetically sealed capillary glass tubes, than on glass plates. But as it rapidly becomes inert under the influence of damp, the transmission of it to this country may be limited to the period between the months of November and May. One great advantage that would be gained by the establishment of a General Hospital on a respectable scale at Rangoon, would be the formation of a school for the instruction of Kareen and Burman youths in vaccination, minor surgery, the simple rules in practice of medicine and hygiene. I know nothing more desirable for the future prosperity of the country than the distribution amongst the community at large, under the auspices of Government, of individuals possessing this knowledge to itinerate professionally over circles assigned to them, and

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at the same time to keep a register of all births and deaths within their range.

I have now brought to a close the first part of my report on British Burmah, as planned at the beginning, and have endeavoured to render it complete in itself, by the introduction of a few general and topographical observations, apart from strictly professional matters. The second or historical part of the report is for the present unavoidably postponed, consequent on my early departure on duty to the Andaman Islands.

Conclusion.

In one of the early series of these papers, I calculated, that it would occupy me three years to complete my inspections and reports of the entire Presidency of Madras, including Pegu and the Straits. These duties have engaged me without any intermission (during the rains or hot seasons) for a period of nearly four years; during which time I have visited and reported on all Civil and Military stations, detachment hospitals, Depôts of Stores and Dispensaries, also such Hill ranges and Coast or insular positions contiguous to these, as appeared to hold out a hope of possessing the necessary advantages for sanitary localities.

In these reports there is necessarily much matter of a discursive character, applicable to subjects of a transient nature and already disposed of by the authorities. But my inquiries have also brought together some topographical and statistical information which might be found useful to Government if complied in a convenient form.

In the prosecution of these inquiries I may state, that I have travelled on duty from the 8th January 1858 to this date, on land, at an average rate of four miles an hour, 12,356 miles, and by sea 11,566; making a total of 23,922.

It is therefore perhaps worthy of consideration, before re-entering on a second tour of inspection and report over the country just traversed, whether the Inspector General of Hospitals may not more profitably for a time engage himself, in compiling a new Edition of the "Government Record," published (1844) seventeen years ago, denominated "Medical Topography and Statistics of the Presidency of Madras,"

embodying therein, all the information relating to sanitary localities and other subjects, collected from that period till now; his services being at the same time available for any special duties relating to professional matters or otherwise.

Memo. of the number of Sick and their Attendants sent to India from the Pegu Division from 18th August 1857 to the 3rd September 1861. See Page 369.

Date of embarkation and Vessel.	European Officers.	European Troops.	Native Troops.	Followers.
18th August 1857, H. C. Steamer Coromandel	...	...	32	8
19th November „ do. Manilla	2	23	211	28
23rd December „ H. C. do. Coromandel	1	30	274	37
Total Sick and their Attendants	3	53	517	73
Deduct for Attendants	...	3	43	3
Balance number of Sick	3	50	474	70
Per centage of sick per annum on strength of Force for 1857.	3·24	8·18	11·46	5·70
3rd February 1858, Steamer Robert Lowe	2	14	334	42
6th March „ do.	1	2	113	25
12th do. „ do. Transport Harbinger	...	1	20	3
22nd do. „ H. C. Steamer Australia	...	...	19	13
30th April „ do. Coromandel	1	13	93	18
15th June „ do. Australia	...	9	75	12
3rd October „ do. Coromandel	10	28	230	67
1st December „ do. Dalhousie	4	29	6	1
Total Sick and their Attendants	18	96	890	181
Deduct for Attendants	...	5	74	6
Balance number of Sick	18	91	816	175
Per centage of sick per annum on strength of Force for 1858.	6·76	3·87	8·66	5·83

Memo. of the number of Sick and their Attendants sent to India from the Pegu Division, &c.

Date of embarkation and Vessel.	European Officers.	European Troops.	Native Troops.	Followers
1st March 1859, H. M.'s Steamer Coromandel	1	73	79	58
2nd do. ,, Transport Lousiana	9	...	527	76
22nd April ,, Steamer Sydney	8	44	198	61
28th May ,, H. M.'s do. Coromandel	4	18	50	22
2nd July ,, do. Sydney	4	11	27	33
August ,, do. Dalhousie	1	20	121	43
27th do. ,, do. Sydney	2	15	32	23
1st October ,, do. do.	5	2	50	48
25th do. ,, H. M.'s Steamer Prince Arthur	...	20	120	37
25th do. ,, Transport Farlie	...	...	44	...
25th Dec. ,, do. Lousiana	1	...	...	...
21st do. ,, P. and O. Steamer Pottinger	...	19	229	42
26th do. ,, do. do. Oriental	...	3	4	11
Total Sick and Attendants	35	225	1,481	454
Deduct for Attendants	...	11	123	15
Balance number of Sick	35	214	1,358	439
Per centage of Sick per annum on strength of Force for 1859	15·21	8·92	13·59	6·57
15th February 1860, Steamer Hindostan	5	33	111	50
17th March ,, do. Governor Higginson and Transport Defiance	7	23	104	38
22nd do. ,, do. Pottinger and Transport Tabul Cain	1	7	51	88

8th May ,, do. do. and do.	6	...	76	...
17th do. ,, do. Fire Queen and Transport Sesostris	3	...	88	4
29th do. ,, do. Hindostan	5	21	73	53
28th June ,, Transport Sesostris	1	12	25	18
31st July ,, Steamer Dalhousie	...	51	70	60
12th Sept. ,, do.	3	29	136	76
15th Nov. ,, do.	1	50	145	50
Total Sick and Attendants	32	226	879	437
Deduct for Attendants	...	12	73	14
Balance number of Sick	32	214	806	423
Per centage of Sick per annum on strength of Force for 1860	14·41	8·98	8·43	7·23
28th January 1861, Steamer Governor Higginson	...	26	116	55
5th February ,, Transport Sesostris	...	2	10	13
23rd do. ,, Steamer Governor Higginson	1	16	22	22
21st March ,, do. Arracan and Transport Sesostris	1	28	16	2
26th do. ,, do. Governor Higginson	...	...	26	6
25th April ,, do. do.	2	3	39	9
29th May ,, do. do.	3	7	36	41
16th July ,, do. do.	...	16	13	6
28th August ,, do. Coromandel	8	18	12	17
Total Sick and Attendants	15	116	290	171
Deduct for Attendants	...	6	24	6
Balance number of Sick	15	110	266	165
Per centage of Sick per annum on strength of Force for 1861	14·27	8·09	6·85	9·41

Memo. of the number of Sick and their Attendants sent to India from the Pegu Division, &c.

Date of embarkation and Vessel.	European Officers.	European Troops.	Native Troops.	Followers
Per centage of Sick per annum, on strength of Force for the whole period from August 1857 to August 1861	11·40	7·80	9·83	6·99
At the above per centage, the average number of Sick per annum that will have to be sent away in future, from the reduced Force will be	16	172	345	70

RANGOON,

17th September 1861.

(Signed) H. O'CONNELL, CAPTAIN,

Asst. Qr. Mr. Genl., Pegu Division.

SERIES No. 11.

PROSTITUTION AND LOCK HOSPITALS AT MILITARY STATIONS.

SERIES No. XI.

PROSTITUTION AND LOCK HOSPITALS AT MILITARY STATIONS.

In the course of these reports, reference has been frequently made to syphilitic disease in relation to the health and efficiency of the troops at different stations. But the question of prostitution in its relation to the health of the Army generally, now demands our attention more at large. SERIES XI.

This difficult question is now attracting the attention of reflecting men at Home both in its physical and moral bearings, and it becomes us to look it in the face here.

From the Army Statistical Reports, presented by H. M.'s Commissioners to Parliament, we gather that the admissions into hospital from venereal diseases, under which head are included all cases arising from impure connexion, amount to 206 in every 1,000 Cavalry soldiers; 250 in the Foot Guards, and 277 in every 1,000 Infantry of the line. The average proportion for the Army at Home is 267 per 1,000, or more than one-fourth of the whole number. It is calculated that on the lowest average, each man is fifteen days under treatment. Thus 688 men out of the Home force are always in hospital from this cause alone; a number equal, or nearly so, to the strength of a Regiment on the Home Establishment, and the money lost to the State is calculated at nearly £14,500 a year. This is startling enough; but the mischief does not stop here, for a large proportion of the sufferers have their constitutions permanently impaired; other diseases are induced, or aggravated by the venereal poison, and mortality and invaliding are largely affected by it.

If we turn to India, we find the case no better. On the occasion of my late visit to the hospital of Her Majesty's 66th Regiment at Cannanore, no less than twenty-five per cent. of the cases under treatment were venereal. The great majority of them, were suffering under the

SERIES XI. true Hunterian chancre, with indurated base, or that form which, according to our best authorities, is essentially the infecting chancre which generates constitutional syphilis. At Trichinopoly, in the hospital of the 2nd European Light Infantry, the baneful effects of this disease were more evident still, inasmuch as the 66th Regiment having but recently arrived in the country the mischief was only visible in its first stage, but at Trichinopoly its constitutional as well as its primary effects were in active operation. But it was at Poonamallee, the Depôt of H. M.'s Regiments for this Presidency, that an opportunity was afforded of seeing syphilis as a cause of invaliding and premature inefficiency in full operation. I here became assured after close inquiry that the great majority of the European Invalids of H. M.'s service in this Presidency have their constitutions more or less impaired by syphilis.

We have now to consider the best means of meeting this indisputable evil. We cannot perhaps indulge the hope that this terrible disease can be entirely banished from the Army; but, I think, it is our duty to devise some plan to reduce it to its minimum. To a large portion of our soldiers, marriage is forbidden, and they seek to gratify the strongest of their appetites, reckless of the consequences.

In time of peace the *ennui* of a soldier's life is great everywhere; but in this country, shut up during a great part of the day as he is, with nothing to occupy his mind, he seeks for excitement in every den of vice and debauchery to which he can obtain access. Means of recreation of late introduced into the Service should be still further extended; healthful and improving employment should be found, and every possible means consistent with discipline should be used to raise the moral and religious tone of the soldier's mind, and to wean him from habits as destructive to himself as they are hurtful and costly to the State. But as we cannot gain our end entirely, or even mainly, by such means, we must have recourse to other measures; we must have the aid of the Magistrate to help us in controlling this "social evil," and here we are sure to be met by many objections. Interference of this sort is not congenial to British habits and customs and tastes; it is "inquisitorial;" it is "unconstitutional;" it is "contrary to the liberty of the subject." The squeamishness of our countrymen in matters of this sort is notorious, and it long stood, and still to some extent stands, in the way of many sanitary and social reforms. The best mode of dealing with this, the Police part of the question, has occupied my most serious attention, and I have put myself in direct communication with several Civil Magis-

trates of experience and ability. To Mr. Robinson, the able Collector and Magistrate of Malabar, I am much indebted for some valuable notes on this subject. It is Mr. Robinson's opinion, as well as my own, that in all our Military Cantonments, prostitution must be placed under license and control. But before one step can be taken in this direction a legislative enactment is required.

Go up to the legislature to have general powers conferred on local Governments to pass "rules for the better prevention of the spread "of venereal disease in Cantonments and large towns,* and enacting "penalties for the infraction of such rules. Introduce the rules first "in your Cantonments and sea-port towns."

Having obtained legislative sanction, we have next to consider the best plan of administering the Act, and here again I cannot do better than quote from Mr. Robinson.

"For the administration of the rules, appoint the Commandant "(not the Commissariat Officer, as the Commandant can always work "through him), the Senior Medical Officer and Senior (have no young "man in it) Magistrate of the district as your Commissioners. Then "license and register every prostitute and brothel, and have them open "to constant inspection. A respectable Dresser and a couple of selected "Peons will do all the work of the "respectable" brothels. The Police "could be called in to check the low riotous brothels and keep the "strictest watch over new comers. Lock hospitals will then be of use. "The women will be in a great measure their own Police and spies, "their own sanitary Commissioners, and with good management the "utmost secrecy might prevail."

"I do not think that such a system would add one prostitute to the "awful profession. It would save thousands of female infants (children "of 10 to 14) that are prostituted in unknown brothels, and I do not "believe that one man would resort to the public brothel more than are "now seeking the gratification of their lusts on the lowest diseased "sluts behind hedges and in filthy huts, and in ditches of our Canton-"ments."

It will be seen that Lock Hospitals enter, as they necessarily must, into this as into all plans for restraining within some bounds this terrible disease, and this involves some expense; but after what has

* This is a more taking title, than an "Act for the better control of prostitution."

SERIES XI. been advanced as to the enormous loss to the State under the present no-system, I think this objection can be got over ; at almost all our stations a Civil Dispensary is already in existence, and it would not be a difficult matter to add a few lofty and well ventilated lock wards to them for the treatment of diseased prostitutes, and to draw up a set of stringent rules for their proper management.

As an illustration of what may be done in the way of prevention, even without any legislation or extraordinary means, I would refer to the following memorandum from the late Dr. Magrath, when Director General, Medical Department, detailing what was done by himself some years ago at Secunderabad.

Memorandum.—" The state of the 3rd European Regiment soon after " its arrival at Secunderabad early in 1855, then a young Regiment scarcely " formed, was such, from the number of cases in hospital of venereal, as " to draw my especial attention to all the local circumstances connected " with the propagation of this loathsome disease, which was ruining the " constitutions of many young men, and laying the foundation in numbers " for future invaliding and loss to the service. There were about eight per " cent. of cases in hospital in a strength at not much more than 700. In " the neighbourhood of the barracks, numbers of native women were " prowling about every evening, and the huts of many not far off. They " were under no surveillance, and no means used to prevent disease. After " some difficulty, I got the Brigadier to sanction the public women being " taken up by the Police, where there was good reason to believe they were " infected, as when pointed out by the men as the persons they got the " disease from, &c., brought to the Civil Hospital, there examined, and if " diseased, kept in until cured. This measure was almost magical, the " number of cases in hospital diminished almost at once to less than half, " and soon after to still less, and it was always found that as diligence " was used in detecting and examining the women, &c., the disease " decreased and *vice versâ*. An attempt was made the year before by " Dr. Goodall when in charge of the Civil Hospital to get diseased women " to it, and he paid an old woman himself to induce the public women to " come to the hospital ; but some dancing girls got up a complaint before " the Police against the old hag, and she was incarcerated for inter- " ference with the *liberty of the subject. !!*"

During the early sojourn of Her Majesty's 74th at Bellary, not only have the large majority of admissions been from this disease, but the majority of invalids sent from the station were from this cause also. A

most marked and happy change, however, became manifest, from the date on which the prostitutes were brought under treatment at the Civil Dispensary Hospital, and instead of having two-thirds of the cases syphilisis, there are now only thirteen out of sixty, or about one-fifth. Many of these are old admissions. SERIES XI.

At all stations of the Army, especially where European troops form part of the garrison, a regular organized system of prostitution is in force. There are two classes of prostitutes, a more respectable class under the control of a procuress, and a low debased class who acknowledge the controlling of a male pimp. At Bellary the better class reside in two localities, one in Roman Catholic Church street, another opposite the Fort gate near the Distillery. In both spots there are receiving-houses for the convenience of women, who, not belonging to the establishment, make assignations with the other sex. The usual hour for the soldier to visit these women is from 2 P.M. until evening roll call. He proceeds to the procuress, deposits with her four Annas, one Anna of which she retains, the balance being the perquisite of the female to whom he is introduced. The soldiers often take a fancy to one particular woman, and by previous arrangement follow one after the other to have connexion with her. A young woman of about twenty-five years was recently brought into hospital here for treatment, from whom I learn that as many as ten soldiers visited her between the hours of 2 and 8 P.M. On the very day of her discharge from the hospital cured, eight soldiers visited her. When inspecting the station of Secunderabad, I was informed that on more than one occasion when the female of their choice was under treatment in hospital, the soldiers although perfectly aware that she was under treatment for venereal, induced her to get over the enclosure to meet them. When these women become diseased they are treated by the procuress with decoctions of roots and herbs, but they seldom recover by this treatment, and the disease is never allowed to interfere with their trade.

The lower class of females are under the charge of a date mat-maker, who receives all their gains, and feeds and clothes them in return. They are usually decoyed to the premises under false pretences of securing work, lodgings, &c., and then drugged. This class are all diseased. Young soldiers, who have but recently joined, frequent their abodes, paying two Annas or five Pice at each visit. From this class a certain number are detailed to attend on guards, and others proceed to the neighbourhood of the barracks, when it becomes dark. On a Regiment proceeding on the march, females of both classes accompany it from the station; some en-

SERIES XI. couraged to proceed by a certain number of soldiers clubbing together their means for this purpose.

Thus we see that the thoughtless soldier regardless of all risks will gratify the strongest passion he possesses. The interests of Government and of humanity alike demand that action be taken to modify, if we cannot stay the evil. Up to July 1848, few or none of these women were received in hospital for treatment. Garrison Surgeon Forbes, well acquainted with the terrible effects of the disease in the European Regiments, to which he was for so many years attached, on assuming charge at this station, gave every encouragement for the admissions, of these females, and in September last, through the instrumentality of Brigadier Macduff, the large number of forty-eight were brought into hospital. I have carefully interrogated them, they are well fed and so well satisfied that they assure me that they will not only return themselves, should they again get disease, but that they will also urge all others, who have it, to proceed hither for treatment. The gratifying result of this bold measure has been the almost total disappearance of the disease from Native as well as European hospitals. The same prompt measures introduced at Bellary are applicable to every other station, and there is hardly any station that I have visited, that I have not found it necessary to urge the subject on the notice of the Director General, and although I have not hitherto found that my recommendations have been acted on, it will be my duty to continue earnestly to press the subject on his attention for the consideration of Government. Increased accommodation is urgently wanted in the present instance to enable the Medical Officer to continue and to extend the good work he has introduced.

The Director General will not fail to observe from a perusal of my several reports, that venereal disease has attained a most alarming height in all parts of this Presidency; uncontrolled by any measures of Government to check its progress and its working fearful destruction amongst our soldiers. He will also have observed that measures of a prophylactic nature, are generally very much required almost everywhere. I unhesitatingly affirm, and I do so as the result of close observation in the extensive field of inquiry now open to me, that many of the maladies which yearly commit such havoc amongst our soldiers are preventible, and that vigorous and liberal measures of sanitation are urgently required, in order to remove or mitigate the causes which generate them.

Impressed with the importance of the subject and anxious to see some general measures introduced with the approbation of the highest authority, when in Calcutta in April last, I solicited and obtained an interview with the Viceroy of India and laid before him my views, leaving with His Lordship a Memorandum, which His Lordship promised to consider; I subjoin an abstract of that paper:— SERIES XI.

" I have taken the liberty to solicit this interview with your Lord-" ship, in order to submit the urgent necessity for the adoption of official " action in the application of sanitary science for the protection of " the British soldier."

" My duties have led me to institute inquiries into the subject at " almost every Civil and Military station within the area of the Madras " Presidency, while I have everywhere found that curative means are " amply provided for, those of a preventive nature are comparatively " few, or are altogether neglected."

" Added to the presence of specific causes of disease tending to " destroy life, and which our Government take no measures to check, we " find that venereal disorders nearly decimate our soldiers. Although " this loathsome malady does not kill, it renders the men a burden on " the State for years, and too frequently it becomes necessary to discharge " them from the service with a poison circulating in their system, which " passes down to their posterity."

" I have witnessed during the progress of my tour, many lamentable " instances of the destructive effects of this disorder. In one Regiment " before they had been four months in the country, there were forty cases " of the disease in hospital. In another, within ten months, 400 cases " of the disorder had passed under treatment; and such was the virulence " of the poison, that in many cases the secondary symptoms of the " disease succeeded the primary before the latter had disappeared. " Some were at once deprived of a great part of their organ by phage-" denic ulceration, and others had suppurating glandular affections, which " undermined their constitutions, and rendered them bed-ridden for " months; many of the men imbibe the disease from the same female, " who, in their eyes, has attractions which render them blind to future " consequences."

" Your Lordship has therefore, I respectfully submit, to consider " what are the best prophylactic measures to adopt, in order to check " the tremendous sacrifice of health and life amongst our soldiers, which

SERIES XI "far exceeds the ratio amongst the Officers of the Army or of the Civil "communities throughout India; measures, sanctioned by science, as "well as by experience, so as to maintain them in an efficient condi- "tion, and reduce the mortality amongst them to a minimum rate."

"Legislative interference is, I submit, necessary, in order to arrest "the destructive effects of venereal disease; for no discipline, however "strict, will prevent the men indulging in the most powerful of all "natural passions."

"Equal in importance is the construction of the habitations of the "men, and the space set apart for each, the drainage, which, in the "case of new barracks, should always be planned and arranged prior "to these being built ; a free supply of water, and the means of "securing ablution; a curb to the facilities which are now open to "the soldier everywhere to procure deleterious intoxicating liquor. "Those are some of the measures which are calculated to preserve "soldiers in health, and to prevent disease from approaching their dwell- "ings ; and although success may not always attend our endeavours, we "ought, I submit, to bear in mind, that whenever we do succeed in "carrying into operation any one established hygienic law, we have "begun to exercise the greatest of the Almighty's gifts to man, namely, "the power of arresting death."

"I respectfully submit that a person having knowledge and "experience in hygienic science, should be nominated as sanitary "adviser to your Lordship, and to the Governor of each Presidency, whose "duty it would be to visit every station, and in communication with the "chief Civil or Military authority, be empowered to authorize the expen- "diture of a fixed amount in carrying out such sanitary measures as "appeared to be immediately required."

"Although this may be considered an inconvenient period for "the introduction of measures attended with any expense to the State, "I respectfully maintain that the results, apart from the humanity of "the question, would be a vast saving to the State in the preservation "of life."

In course of my tour, I found that the General Order by His Lordship the Commander-in-Chief in India, No. 107, published in General Order, 2nd December 1858, is for all useful purposes, pretty nearly a dead letter. At the head-quarters of Divisions it did not seem to be clearly understood, whether the word Senior Medical, in paragraph 1, meant the Deputy Inspector General of Hospitals, or the Senior Executive Officer

present; consequently, little or no action seems to have been taken to carry out His Lordship's views. SERIES XI.

I would, in conclusion, earnestly press this subject on the serious consideration of those in authority; the evil is a shocking one, it is increasing on our hands, and it demands on every ground, moral and physical, our best efforts to root it up.

SERIES No. XII.

DUTIES OF ADMINISTRATIVE AND EXECUTIVE MEDICAL OFFICERS AND SUBORDINATES.

SERIES No. XII.

DUTIES OF ADMINISTRATIVE AND EXECUTIVE MEDICAL OFFICERS.

The published instructions issued for the guidance of the Inspector General of Hospitals, directs him "to issue no orders to Medical Officers or others, but to report fully on every point to the Director General." Were he to obey these directions to the letter, his reports would swell out to an inordinate extent with many subjects which are not of sufficient moment to place before the head of the Department, nor to introduce into an official document, and which may be remedied on the spot by a few words of advice or direction.

As second in the department, the Inspector General ought to possess the full confidence of its head; something should be left to his discretion, and although his recommendations may meet with ready acquiescence yet it is not for the good of the service that he should be hampered by instructions which engender a feeling of reserve, if not restraint, between himself and those whose Departments come under his inspection. It would be of advantage to the service if the orders were altered, so as to leave more discretion to the Inspector General in these matters.

I am deeply impressed with the conviction that the principle of selection for the administrative branch of the Medical Department should be very rigidly enforced. Every one of us must remember the anxieties experienced in the early days of our career when we suddenly found ourselves in the sole charge of a large body of Officers and men, whose lives were without appeal in our hands, and if we speak the truth, most of us must confess that we have purchased our experience most dearly.

The importance therefore of judicious inspection cannot be overrated, especially in a service constituted as ours is, where the seniority system of advancement is the rule, and selection the exception.

I am strongly of opinion that the duty of aiding our young Medical Officers by placing over them men capable of guiding and advising them, has been too much neglected. I think it a blot on our system that mere seniority shall entitle a man to a place that ought to be filled only by one

SERIES XII. to whom the young Physician can look up, not merely as to an official superior, but an experienced counseller, to whom he can resort with confidence in the hour of difficulty. Special men must be had for special services.

M. Baudens, the Principal Medical Officer over the French Army, before Sebastopol, while not slow to give credit for all that was excellent in the Medical arrangements of the British Army, noted it as a great defect in our system, that the most responsible charges were solely in the hands of young men of little experience, while the superintendence of Inspecting Officers was almost entirely devoted to the general economy of the hospitals.

On entering on my duties in January 1858, I stated that, allowing a period of three months in each Division, I expected it would occupy me fully three years to inspect every Department within the area of this Presidency, including British Burmah and the Straits of Malacca. The duty has occupied me exactly four years, and with the imperfect means of transit available, it was totally impossible to accomplish it in a shorter time. Hereafter, I am satisfied that the Inspector General should be allowed five years to go over his entire circle as per margin. Some consideration must be given for periods of repose from travelling at certain seasons, and for acquiring an insight into the character of the Medical Officers, and the working of their establishments.

1st Year. Presidency Div. Mysore Division.
2nd Year. Centre Division, Malabar and Canara, Southern Div.
3rd Year. Northern Div. Ceded Districts.
4th Year. Hyderabad Territories, Nagpore Territories, Saugor and Nurbudda.
5th Year. Straits of Malacca. British Burmah.

In no other Army in the world are young men entrusted with responsibility at so early a period in their career; and it follows, that nowhere ought more vigilance to be exercised, than in the selection of those whose duty it is to support and direct them in the discharge of their difficult duties. Their moral as well as their professional reputation should not be open to question.

A Deputy Inspector General of Division is obliged to make a weekly visit to every hospital at his head-quarters and an annual or biennial inspection of all out-stations within the circle of his range. In the latter case, Executive Medical Officers, not at head-quarters, receive official intimation of his approach, in order to prepare for his appearance. This should not be.

The best of us are apt to become lax, and to fall into a routine system of doing our duty, if left uncontrolled too long. The stated hours of attendance at hospital may be altered to suit our convenience; the hospital work is then hurried over and too much is left to the Subordinate.

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It is not for the good of the public service that the present arrangement should continue, which permits the Deputy Inspectors General of some Divisions, as Trichinopoly and Burmah, to make a personal Inspection of the Civil and Military establishments within their Divisions once in every two years. Under this system, a Regiment at Quilon may embark for Tonghoo without having been inspected for two years, and may in like manner not see the P. M. O. of the Pegue Division for two years after its arrival in Burmah.

Office of Deputy Inspecters General.

The Director General is aware that there is generally much delay in the receipt of returns, &c., from the offices of Deputy Inspectors General of Divisions. I made it my business to inquire into the cause of this, and have no hesitation in affirming that the delay arises from the inadequate office establishment at his disposal.

The Office allowance to the Deputy Inspector General of Hospitals of the Home Army stationed in Madras, is	Rupees	214
Deputy Assistant Adjutant General of a Division receives...	„	100
Do. Quarter Master do. do.	„	117
Deputy Inspectors General of Hospitals of Divisions receive for Writer and Stationery	„	60

Already their office expenses exceed the sum allowed, and the office work tends to increase instead of to decrease.

The following statement of the work performed in one office will give a good idea of what has to be done in all.

Deputy Inspector General of Hospitals' Office, Southern Division.

Official documents required to be furnished monthly to the Director General of the Medical Department.

1 Report of movements of Medical Officers, &c.
1 Nominal Return of Medical Officers and servants.
1 General Abstract Return of sick, Military and Civil.
1 General Return of sick, Military Department.
1 General Return of sick, Civil Department.
1 Do. of Vaccination by Vaccinators.
1 Do. do. by Medical Subordinates.
1 Do. do. in Collectorates.

Official document required to be forwarded monthly to the Officer Commanding the Division, not ordered by the Medical Code, but has been furnished for many years past.

1 Nominal Return of Medical Officers and servants in the Southern Division.

SERIES XII. Official document required to be furnished to the Adjutant General of the Army, Madras, as soon after the beginning of each month as possible, not ordered by the Medical Code, but has been furnished since the year 1843.

1 Return showing how the Military Medical Officers and Subordinates were employed on the first of each month.

Registering monthly Indents (ranging from forty to forty-three) for perishable articles, &c., supplied to Hospitals in the Division, not ordered by the Medical Code, but has been done for many years past.

Official documents due on the 1st January of each year.

1 General Annual Return of sick, Civil Department.
1 Special Medical Report on Jails, &c.
1 General Annual Medical Report on Civil Dispensaries.
1 General Annual Return of Vaccination by Vaccinators.
1 General Annual Return of Vaccination by Medical Subordinates.

Official documents due on the 1st of April of each year.

General Tabular Statements, Annual, Military Department.
1 General Annual Medical Report on the health of the Troops in the Division.

Official documents due on the 1st May of each year.

1 General Annual Return of sick treated in the Jail and Civil Dispensaries, in the Division from 1st May to 30th April of each year.
1 General Annual Return of Vaccination by Vaccinators from 1st May to 30th April of each year.

Copies are kept in the Office of all the above Returns, Reports, &c.

Correspondence is carried on throughout the year between this Department and the undermentioned authorities, viz.:—

Director General Medical Department.
Medical Officers in the Division.
Officer Commanding the Division.
Commissariat Officers in the Division, and other public functionaries, as occasion requires.

Section 7, Article 44 of the Medical Regulations directs the following records to be kept up:—

1st.—Register of letters received.
2nd.—Letter book.
3rd.—Circular book.
4th.—Return book.

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5th.—Inspection Report book.

The correspondence connected with the Madras Medical Book Society, ıd the circulation of its periodicals among the subscribers in the Division, e also carried on in this office.

The numerous Returns, Reports, Statements, Indents of various escriptions, Diet Rolls, Explanatory Memoranda, Cases of Officers, ıck certificates, have to undergo examination.

Medical Subordinates.

The strength of the Medical Subordinate Establishment was under the ıthorized complement in almost every station I inspected; repeated ıanges amongst this class are attended with much inconvenience to the ıdividuals and to the Medical Officer. Quarters should be provided in very Hospital as a permanent residence for one Medical subordinate. have observed that the young men sent out from College are not proided with any work on the practice of physic. They receive books on ınatomy, Surgery, Physiology, Materia Medica and Botany, but none hich bear on the subject which they are daily called on to observe.

Hospital Servants,

I now come to the subject of Hospital servants. In my notes, I find ıe following entry:—"1st Cavalry,—Toty Choury, forty-six years' service, ıas always done his duty well; he is not capable of further service; has o friend to take his place, is therefore kept on, as he would starve were he lischarged; and this is not a solitary case." I beg to recommend that some mall provision in the shape of donation or pension after long service be anctioned to Hospital servants.

A very indifferent class of servants are secured in Civil Dispensaries ıt the pay allowed, namely, Cook and Ward cooly Rupees 4; Nurse 3-8-0; and Toty 3 Rupees per mensem. It is with difficulty they can be nduced to remain.

A fixed establishment of servants is allowed by regulation for every hospital; when sick increase, the complement is found to be too low. I think it would be a good plan to regulate the number of attendants by the number of patients in hospital.

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